

CA2A206  
50423  
May 31/50  
Vol 5



# The Province of Alberta

---

## PETROLEUM AND NATURAL GAS CONSERVATION BOARD

Application for Permission to Remove or cause to be removed  
Natural Gas from the Province of Alberta, under the Provisions of the  
Gas Resources Preservation Act by Northwest Natural Gas Company  
and Alberta Natural Gas Grid, Ltd.

---

I. N. McKinnon Esq., Chairman

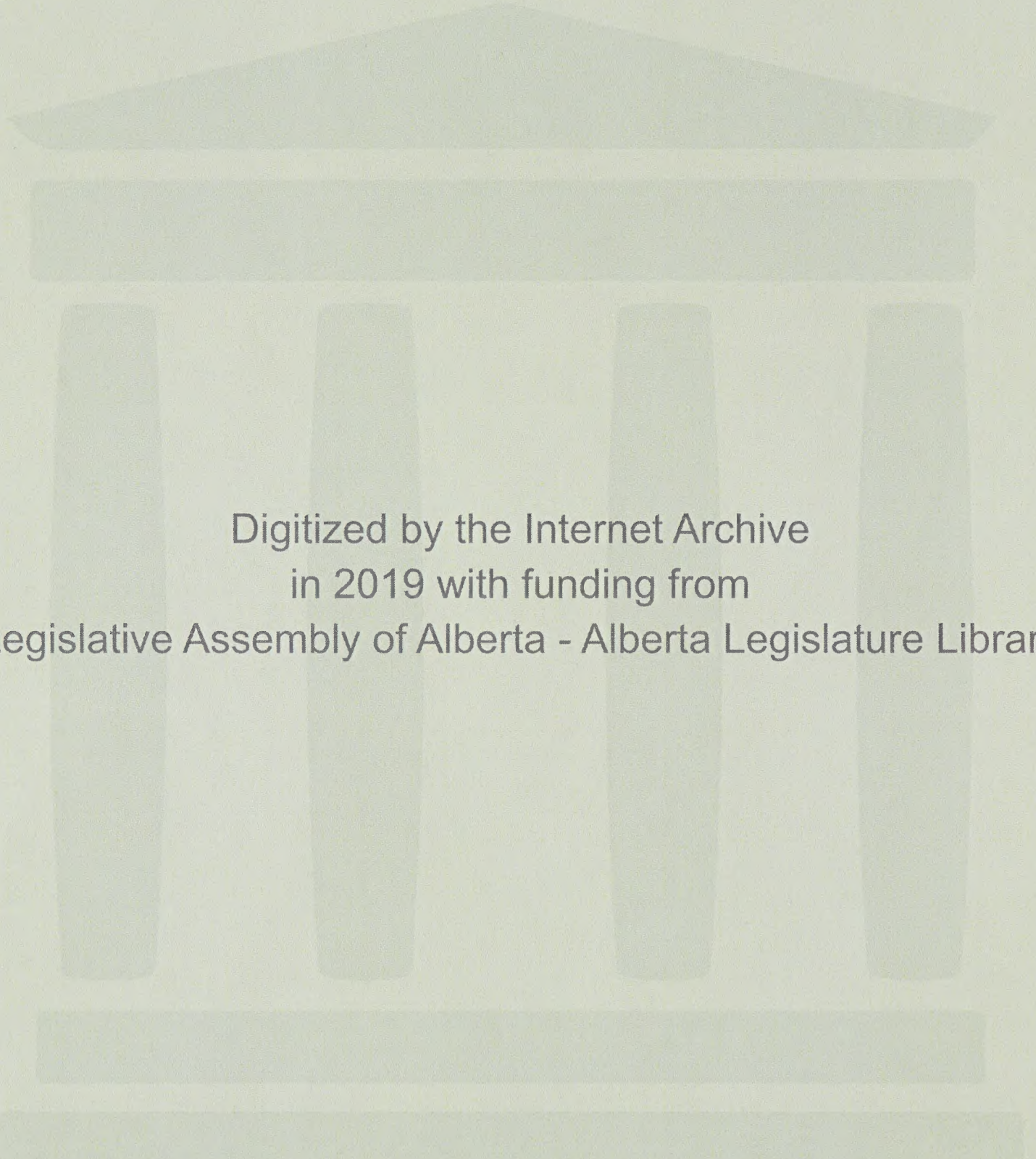
D. P. Goodall Esq.

Dr. G. W. Govier

**Session:** May 31st, 1950.

**Volume** 5.





Digitized by the Internet Archive  
in 2019 with funding from  
Legislative Assembly of Alberta - Alberta Legislature Library



# I N D E X

---

VOLUME 5.

MAY 31st, 1950.

## W I T N E S S E S

	<u>Page</u>
Remarks by Mr. Nolan, . . . . .	195
 <u>FULTON W. COPP</u>	
Direct Examination by Mr. Nolan , . . . . .	196
 <u>WILLIAM CROSSLEY MAINWARING</u>	
Direct Examination by Mr. Nolan , . . . . .	213
Cross-Examination by Mr. Fenerty, . . . . .	215
Cross-Examination by Mr. S.B. Smith , . . . .	217
Cross-Examination by Mr. Fenerty, . . . . .	217
Cross-Examination by Mr. C.E. Smith , . . . .	219
 <u>RICHARD SMITH DAVIDSON</u>	
Direct Examination by Mr. Nolan , . . . . .	221
Cross-Examination by Mr. S.B. Smith , . . . .	253
Cross-Examination by Mr. Fenerty, . . . . .	257
Cross-Examination by Mr. C.E. Smith , . . . .	264
Cross-Examination by Mr. Frere, . . . . .	265
Cross-Examination by Mr. D.P. McDonald, . . .	266
Cross-Examination by Mr. S.B. Smith , . . . .	278
 <u>LELAND E. JONES</u>	
Direct Examination by Mr. Nolan, . . . . .	280
Cross-Examination by Mr. Fenerty, . . . . .	313
Cross-Examination by Mr. S.B. Smith , . . . .	317

## E X H I B I T S

<u>No.</u>		
5	Submission by Mr. F.W. Copp re Natural Gas Markets in Southern British Columbia, Washington and Oregon, . . . . .	196
6	Brief prepared by British Columbia Electric Company Limited, . . . . .	222
7	Brief submitted by Seattle Gas Company , .	281



6 MAY 1951

MAY 31 1951

SECRET

100

.....

101

.....

102

.....

103

.....

104

.....

105

.....

106

.....

107

.....

108

.....

109

.....

110

.....

111

.....

112

.....

113

.....

114

.....

115

.....

116

.....

SECRET

117

.....

118

.....

119

.....



## Opening Remarks

- 195 -

VOLUME 5.May 31st, 1950.

MR NOLAN:

Mr. Chairman and Gentlemen.

Before proceeding with the evidence this morning I have two requests to make. In my opening remarks on Monday morning I intimated that I would adhere as closely as possible to the program that I set out and which I provided the Board with before the opening of this application. You will have observed that amongst the witnesses that I am calling there are a number of gentlemen from the Province of British Columbia, the State of Washington and the State of Oregon, who have accepted our invitation to come before the Board and tell the Board about the gas business in those various cities in the Province of British Columbia and the States of Washington and Oregon. These are gentlemen, of course, over whom I have no control, and who have voluntarily and at great inconvenience to themselves appeared and they are anxious to get away. I am going to ask the Board if it will permit me to have Mr. Slipper stand down at this stage and to introduce some of my marketing evidence this morning, beginning with Mr. Copp, who is an employee of the applicant. After Mr. Copp has read his submission, I am going to ask the Board to permit me to stand him down, so that his cross-examination can come on when these gentlemen who have come some distance have returned to their homes. I want to make it perfectly clear that Mr. Slipper will be made available and will be brought back for cross-examination, that Mr. Copp will be here, and all I am trying to do is to accelerate the proceedings so that I may release these gentlemen, whom I



Operating Remarks

- 105 -

VOLUME 5

May 1st, 1950

Mr. [Name] and [Name]  
Mr. [Name] and [Name]

W. [Name]

Before proceeding with the evidence, I have  
two requests to make. In my opening remarks on Monday

morning I indicated that I would subsequently be  
available to the program that I set out and which

provided the Board with before the opening of this special  
session. You will have observed that among the witnesses

that I am calling there are a number of witnesses from the  
Bureau of British Columbia, the British Columbia and

the State of Oregon, who have accompanied me to  
come before the Board and tell the Board about the

business of these various states. I have provided a British  
Delegation and the State of Washington and Oregon. These

are witnesses of course, even when I am not called and  
who have voluntarily and of their own initiative to

appear and they are anxious to get sworn in to testify to  
ask the Board if it will permit me to have Mr. [Name] stand

down at this stage and to introduce some of the evidence  
before this morning, beginning with Mr. [Name] who is an

employee of the applicant. That Mr. [Name] has been the  
substantive, I am going to ask the Board to permit me to

stand him down, so that his cross-examination can come on  
when these gentlemen who have come from British Columbia

returned to their homes. I want to acknowledge that  
clear that Mr. [Name] will be made available and will be

brought back for cross-examination. Mr. [Name] will be  
here, and all I am trying to do is to complete the

process so that I may release these gentlemen, whom I



Opening remarks.  
F. W. Copp,  
Dir. Ex. by Mr. Nolan - 196 -

have mentioned to the Board.

Now, I have discussed this matter with the Counsel to the Commission and he is agreeable that we proceed as I have suggested, and so if the Board does not disapprove, and there is no objection from Counsel, I will proceed that way.

THE CHAIRMAN: Quite agreeable to the Board, Mr. Nolan.

MR. NOLAN: Thank you very much, sir.

.....

FULTON W. COPP, having been first duly sworn, examined by Mr. Nolan, testified as follows:-

MR. NOLAN: For the information of the Board and of Counsel, I might mention that the submission to be made by this witness is entitled "Natural Gas Markets in Southern British Columbia, Washington and Portland, Oregon," and I request the Board to give that document a number at this stage.

THE CHAIRMAN: I wonder if we could be supplied with copies.

MR. NOLAN: Yes.

THE CHAIRMAN: That will be Exhibit Number 5.

SUBMISSION RE NATURAL GAS MARKETS  
IN SOUTHERN BRITISH COLUMBIA, WASH-  
INGTON AND PORTLAND, OREGON, MARKED  
AS EXHIBIT 5.

Q Mr. NOLAN: Now, if the Board has this Exhibit Number 5 before it, I will proceed. Mr. Copp, what is your full name?

A Fulton W. Copp.



Planning Committee  
J. W. Gage  
1944

have mentioned to the Board.

Now, I have discussed this matter with the

Committee to the Board and as a result of the discussion  
as I have suggested, that to the Board does not approve,  
and there is no objection from the Board, I will proceed that

way.

The Chairman:

Will appreciate to the Board, Mr.

Wojan.

Mr. Wojan:

Thank you very much, Sir.

.....

Thank you, Sir, for the time

only sworn, witnessed by Mr. Wojan, testified as follows:

Mr. Wojan:

and of Gage, I might mention that the Committee is to

need of this witness is satisfied. Witness has been in

Southern States Committee, Washington and Baltimore, D.C.,

and I request the Board to give that document a number of

this page.

The Chairman:

I wonder if we could be supplied

with copies.

Mr. Wojan:

Yes.

The Chairman:

That will be better than that.

Committee to the Board and as a result of the discussion  
as I have suggested, that to the Board does not approve,  
and there is no objection from the Board, I will proceed that

Now, if the Board has this matter

known to the Board, I will proceed, Mr. Gage, that is all

Will thank

Mr. Wojan.



F. W. Copp,  
Dir.Ex. by Mr. Nolan

- 197 -

Q And by whom are you employed at the present time?

A Northwest Natural Gas Company.

Q How long have you been employed by that Company?

A Since March, 1928.

Q Now, are you an engineer?

A I am.

Q Tell me something of your qualifications, will you, please?

A I was graduated from the University of Illinois with a degree of Bachelor of Science in Railway Electrical Engineering.

Since 1928 I have been continuously engaged in engineering work. I was a natural gas engineer with West Virginia Gas Corporation and associated companies, working in Kentucky, Ohio and West Virginia. I made market surveys for industrial companies in these States for the Texas Gas Utilities Company in Southwest Texas, and assisted in such a survey of Detroit. I have also made engineering surveys in connection with transmission and distribution systems. For several years before the war I was a gas engineer with the United States Federal Power Commission, during which time I made detailed studies and prepared analyses of operations of Colorado Interstate Gas Company, Colorado-Wyoming Gas Company, Lone Star Gas Company and El Paso Natural Gas Company in connection with rate cases.

During the war, 1942 to 1947, I was an officer in the Corps of Engineers, Army of the United States. I was a supervisor of construction, maintenance and repair of all types of military installations in the Southwest. After leaving the military service I returned to the Federal Power Commission for six months as a member of the staff of the Gas Surveys Division. During this







F. W. Copp,  
Dir.Ex. by Mr. Nolan

- 198 -

period I have analyzed and prepared reports for the Commission of markets to be served by Texas Eastern Transmission Corporation and Transcontinental Gas Pipeline Corporation.

Since March, 1948, I have been employed by the Northwest Natural Gas Company and have continuously studied the markets for natural gas along the North Pacific Coast, including Portland, Tacoma, Seattle and Vancouver. I have made surveys for natural gas in Spokane. Also I have made surveys for industrial uses of natural gas in this area, including the Consolidated Mining & Smelting Company of Canada Limited, and the Hanford Works of the United States Atomic Energy Commission. I am a registered professional engineer in Texas and Alberta.

Q Now, the results of that market survey or study that you have made have been reduced to writing and are contained in Exhibit 5?

A That is correct, sir.

Q Which document was prepared by you?

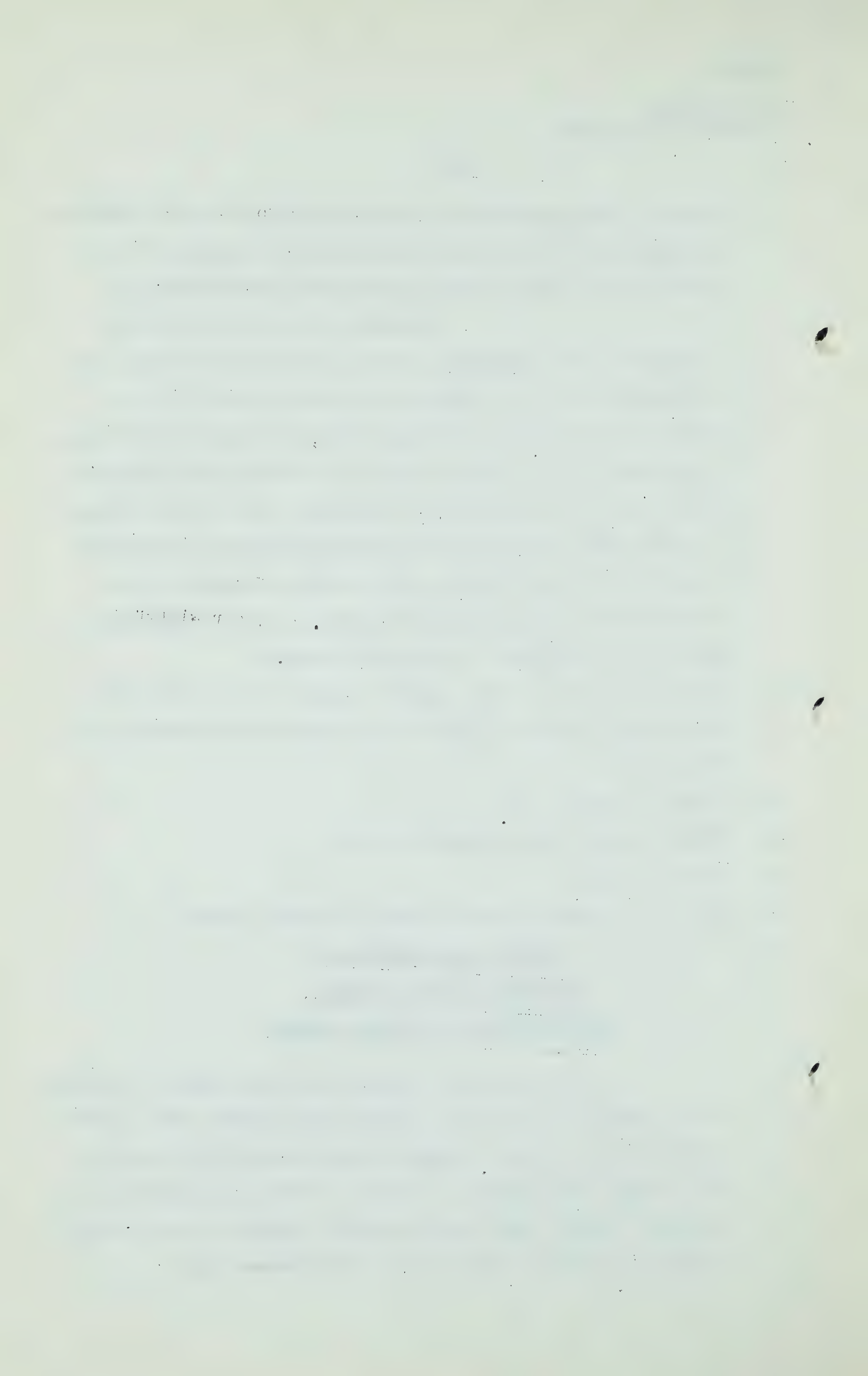
A That is right.

Q Will you be good enough to read it to the Board?

A NATURAL GAS MARKETS IN  
SOUTHERN BRITISH COLUMBIA,  
WASHINGTON AND PORTLAND, OREGON

This exhibit is concerned with the markets available to the various routes of a natural gas pipeline from Alberta to the Pacific Coast. Primary consideration has been given to the gas requirements in Canada. The area proposed to be served, together with three possible pipeline routes, designated A, B, and F, are shown on the attached maps.







F. W. Copp,  
Dir.Ex. by Mr.Nolan.

- 199 -

Q Now, perhaps you might just refer to those for a moment, to draw the attention of the Board and Counsel of the maps?

A The first map in the back of the exhibit is so-called Route A.

Q And that is indicated in the lower righthand corner of the map itself?

A That is correct.

Q Where it is entitled Route A?

A Yes. That is followed by another map.

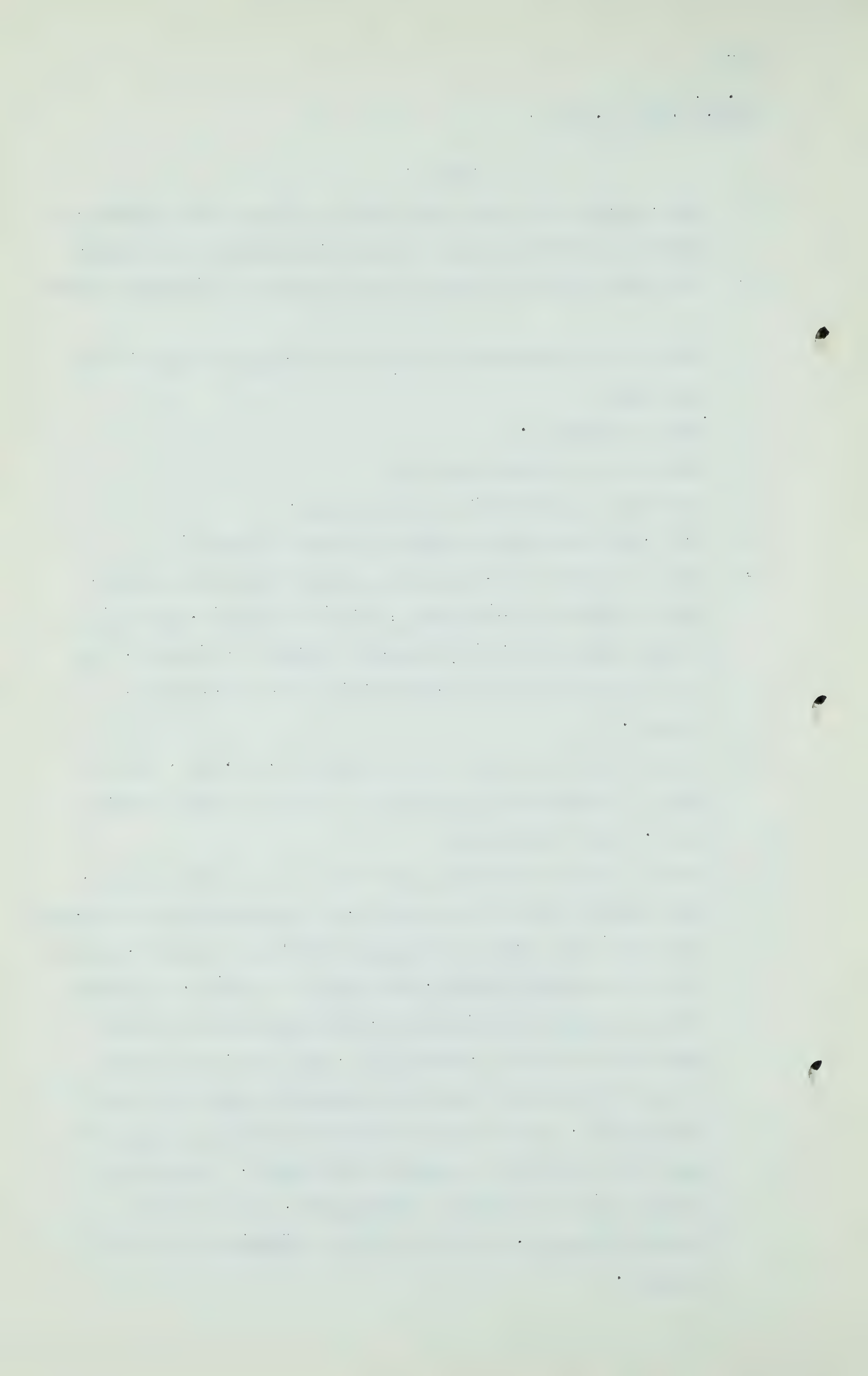
Q Well, just generally speaking, Route A is what?

A Route A starts in Alberta and proceeds westerly entirely within Canada to Aldergrove, British Columbia. There is a lateral line south from Columbia Gardens to Spokane. The line continues on from Aldergrove south to Portland, Oregon.

Q I think that is enough for the present, Mr.Copp. We are going to discuss this question of routes in great detail later. Turn to Route B?

A Route B is the second map, and starts at the same place, near Pincher Station in Alberta, and proceeds westerly through the Crow's Nest Pass to Kingsgate, British Columbia, crosses the International border, continues to a point, continues south to a point near Spokane, and then westerly across Washington to Monroe, Washington, from there runs north to the International Border at Aldergrove and on to New Westminster. The southern branch of that line starts at Monroe and proceeds southerly to Portland. There is a lateral line from Newport, Washington, north to Trail, British Columbia, and one in Central Washington south to Hanford.







F.W. Copp,  
Dir. Ex. by Mr. Nolan

- 200 -

Q Yes. I think that is enough of that. And Route F is the next one?

A Route F is the next map, the largest one, and it shows the proposed pipeline routes from the vicinity of Stony Plain, near Edmonton, via the Yellowhead Pass route to Kamloops, on to Princeton, via the Allison Pass to Hope, to Aldergrove, Vancouver, and south to Portland, Oregon. There are no lateral lines off this route.

Q Now, would you go on and read the script, "The principal cities in this area..."

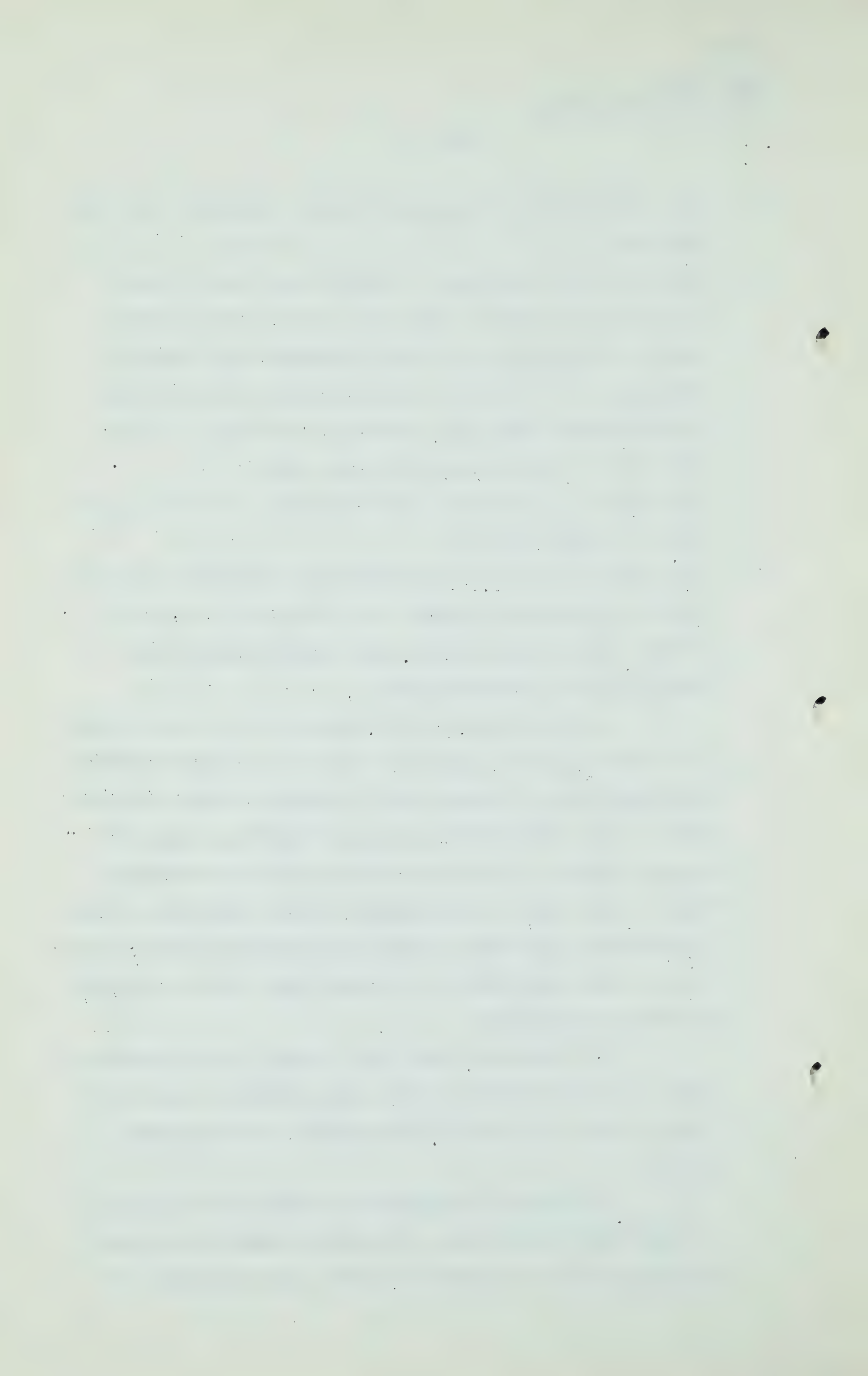
A The principal cities in this area are Vancouver, Portland, Seattle, Spokane and Tacoma. All of these, as well as several other cities in the area, are now served with manufactured or butane-air gas.

Alberta Natural Gas Company and Northwest Natural Gas Company plan to supply gas to all of the gas distributing companies in this area and to furnish the gas requirements of The Consolidated Mining and Smelting Company of Canada, Limited, in British Columbia and to the Hanford Works of the United States Atomic Energy Commission. Other communities in British Columbia not presently served with gas and which may desire to purchase gas from the pipeline will also be supplied.

If Route A is selected it would not be feasible to serve the Hanford Works. This route, however, might make possible some gas distributing systems in the Okanagan Valley.

If Route F is selected it would not be possible to serve the Hanford Works, The Consolidating Mining and Smelting Company of Canada, Limited, the communities of







F.W.Copp,  
Dir.Ex.by Mr. Nolan

- 201 -

Trail, Rossland, Nelson, Creston, Cranbrook, Kimberley and Fernie and the city of Spokane. Gas service would be available to Hope, Princeton and Kamloops.

If Route B is selected all of the markets listed in Table B (Table B is at the back of the Exhibit and will be discussed later) would be supplied, including the Hanford Works, The Consolidated Mining and Smelting Company of Canada, Limited, the communities of Trail, Rossland, Nelson, Creston, Cranbrook, Kimberley and Fernie. From this route it may be feasible in the future to construct a lateral line to serve communities in the Okanagan Valley. Gas service would not be available to Kamloops.

Three other pipeline routes known as C, D and E have been surveyed. These routes would serve the same market area as Route A. They would not serve the Hanford Works. In this Exhibit, for simplicity of discussion, no further reference is made to Routes C, D or E.

Q May I just interrupt you for a moment. Mr. Chairman, there will be a discussion about those other routes, C, D and E, later in the Inquiry, but not through this particular witness.

A Alberta Natural Gas Company would, if Route A or B were selected, take gas from Alberta Natural Gas Grid, Ltd. at Pincher Creek Station, Alberta. In the case of Route F, Alberta Natural Gas Grid Ltd. would deliver gas to Alberta Natural Gas Company at a point west of Edmonton.

Over Route B, Alberta Natural Gas Company would deliver gas to The Consolidated Mining and Smelting Company of Canada, Limited, for use in British Columbia; to British Columbia Electric Company, Limited, for distribution in Vancouver and other areas; and to Northwest Natural Gas







F. W. Copp,  
Dir.Ex. by Mr. Nolan

- 202 -

Company. Natural gas sold to The Consolidated Mining and Smelting Company of Canada, Limited, and British Columbia Electric Company, Limited, will be transported for the account of these customers by Northwest Natural Gas Company from the International Border at Kingsgate, B.C., to the International Border at Waneta and near Aldergrove, B.C., respectively.

Gas distribution companies to which Alberta Natural Gas Company and Northwest Natural Gas Company plan to supply gas will present data to the Board concerning their present operations, together with information relative to population, cost of other fuels, number of customers and estimated natural gas requirements. Maximum day demands by uses and customer classification will be given in detail. Meteorological data and its effect on gas consumption will also be presented.

(Go to Page 203)





F. W. Copp,  
Dir. Ex. by Mr. Nolan.

- 203 -

For the convenience of the Board, the estimated natural gas requirements of the area which Alberta Natural Gas Company and Northwest Natural Gas Company propose to serve in British Columbia, Washington and Oregon are summarized in the tables of this exhibit. The data contained in these tabulations are a consolidation of the presentations by the distributing companies and estimates for communities in southeastern British Columbia along the proposed pipeline route. Also included are the estimated gas requirements of The Consolidated Mining and Smelting Company of Canada, Limited, for its operations at Trail and Kimberley, B. C., and the estimated gas requirements of the Hanford Works of the United States Atomic Energy Commission.

#### Population

The population which will be served by the distributing companies to which Alberta Natural Gas Company and Northwest Natural Gas Company propose to sell gas is estimated to be presently in excess of 2,000,000 and is estimated to reach 2,800,000 within the next decade.

The total population of the area which the pipeline will serve is increasing more rapidly than other sections of Canada and the United States. This is evidenced by the fact that the population of British Columbia has increased 60.5 per cent for the period 1931-1949, as compared to 30.5 per cent for Canada as a whole (B.C.E. Exhibit).

Q You are anticipating that exhibit being presented to this Board?

A That is correct.





F. W. Copp,  
Dir. Ex. by Mr. Nolan.

- 204 -

Washington and Oregon have increased in population by 43 and 53 per cent, respectively from 1930 to 1949, while the estimate for the entire United States is approximately 15 per cent. Table A-1 shows the estimated population for the principal cities and towns. That data is from the Pacific Coast Board of Intergovernmental Relations. Table A-1 shows the estimated population for the principal cities and towns. We might at this stage look at Table A-1.

Q Yes, because you do not refer to that again?

A That is correct. Table A-1, which is in the back of the report, shows the population of the communities in British Columbia, Washington and Oregon along central gas pipeline routes. The data here is limited to cities or communities or towns of 1,000 or more.

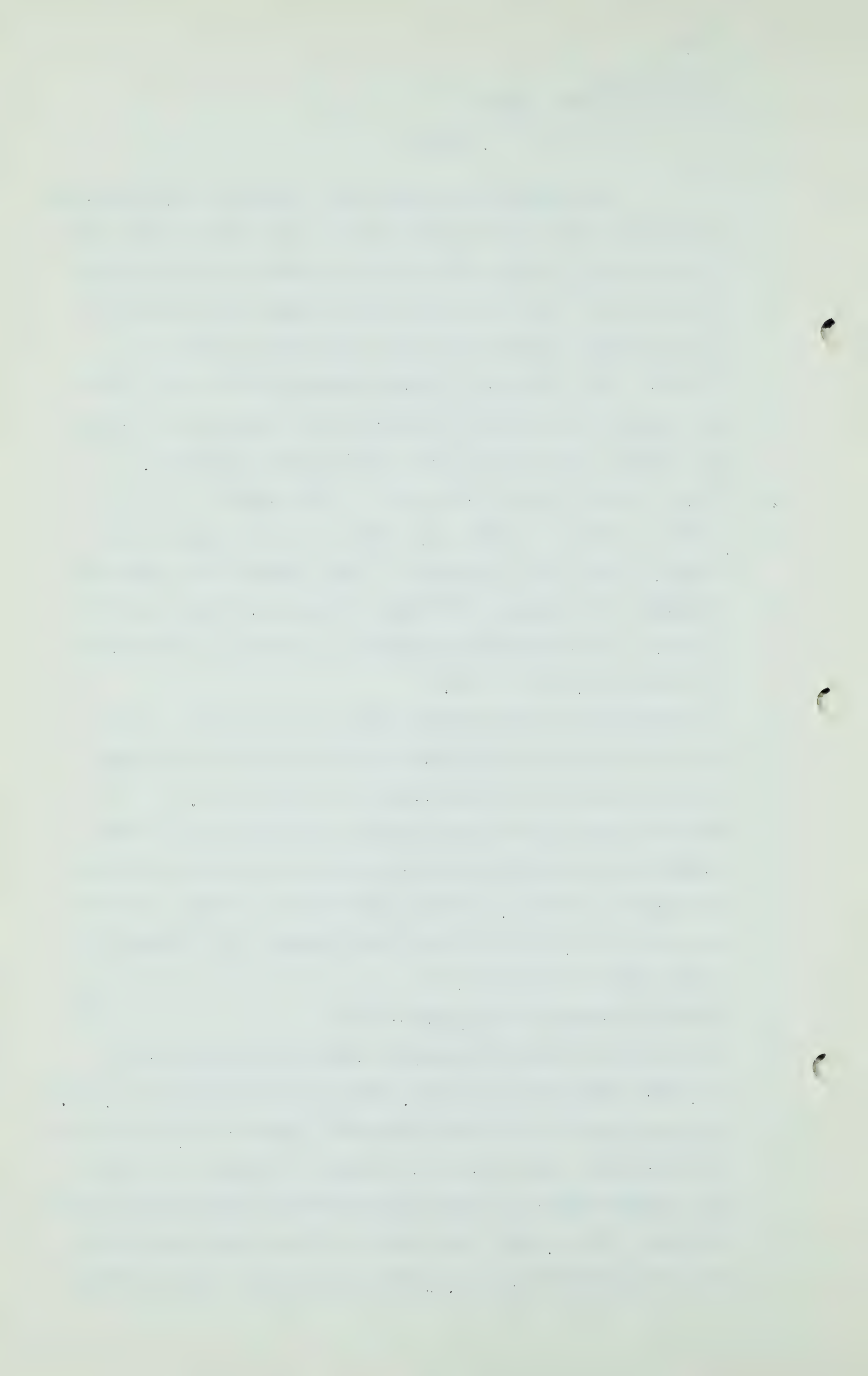
Q I think some counsel perhaps have not found that. It is just at the end of the report before we come to the small typed tables. It is after page 9. Please go on.

A The first part of the table gives the population for the communities in British Columbia and they have been divided according to Route A, Route B and Route F. These would be served by the Alberta Natural Gas Company. The second or lower half of the table - -

Q Just deal with that top part first.

A The total for British Columbia listed under Route A is 677,291; under Route B is 671,660 and under Route F, 647,991. The lower half of the page shows the communities in the State of Washington, also listed according to Routes A, B and F. In reproducing this exhibit there was one figure inadvertently omitted. The 26,000 shown there as Camas-Washougal should be put opposite Vancouver, Washington in all three columns





F. W. Copp,  
Dir. Ex. by Mr. Nolan.

- 205 -

and there should be a figure of 6,578 inserted for Camas-Washougal in all three columns.

Q MR. C. E. SMITH: Six thousand and what?

A 6,578. The total for the State of Washington under Route A is 1,167,860; under Route B, 1,188,610 and under Route F, 925,286.

Q MR. NOLAN: Is that figure of 6,578 included in that total?

A Yes, sir. The next page of this table is for the State of Oregon. Here, counties are shown rather than individual cities because the Portland Gas & Coke Company has a rather wide distribution system and cover practically all the important places in these counties. They are listed by the different routes. The total for Oregon under Route A is 478,025; for Route B, 478,025 and Route F, 478,025. The total for the entire system under Route A is 2,323,176; for Route B, 2,338,295 and for Route F, 2,051,302.

Q MR. FRERE: And to that should be added the 6,578?

A That is included in that total.

Customers and Uses of Natural Gas.

The distributing companies have prepared tabulations showing the estimated number of customers by classes of service for the first five years of natural gas operation. A summary of these various studies is shown in Table A of this exhibit.

Q MR. NOLAN: Just a word about Table A and something about how you have compiled it. From what information?

A Table A is the estimated maximum number of domestic,





F. W. Copp,  
Dir. Ex. by Mr. Nolan.

- 206 -

commercial and industrial consumers to be supplied with gas for each market area.

Q And they have been divided into the same three divisions, British Columbia, Washington and Oregon?

A That is correct, sir. The information in this table was supplied to me by the distributing companies excepting for the smaller communities in southeastern British Columbia, namely Fernie, Cranbrook, Kimberley, Trail and Rossland.

Q And that is divided into two periods of time, the end of the first year of natural gas and the end of the fifth year?

A That is correct.

Q Is there anything else that can be usefully pointed out in Table A? It is self-explanatory, is it not?

A I think it is.

Q The figures are there and will be discussed in more detail by the representatives of the various companies who compiled these figures?

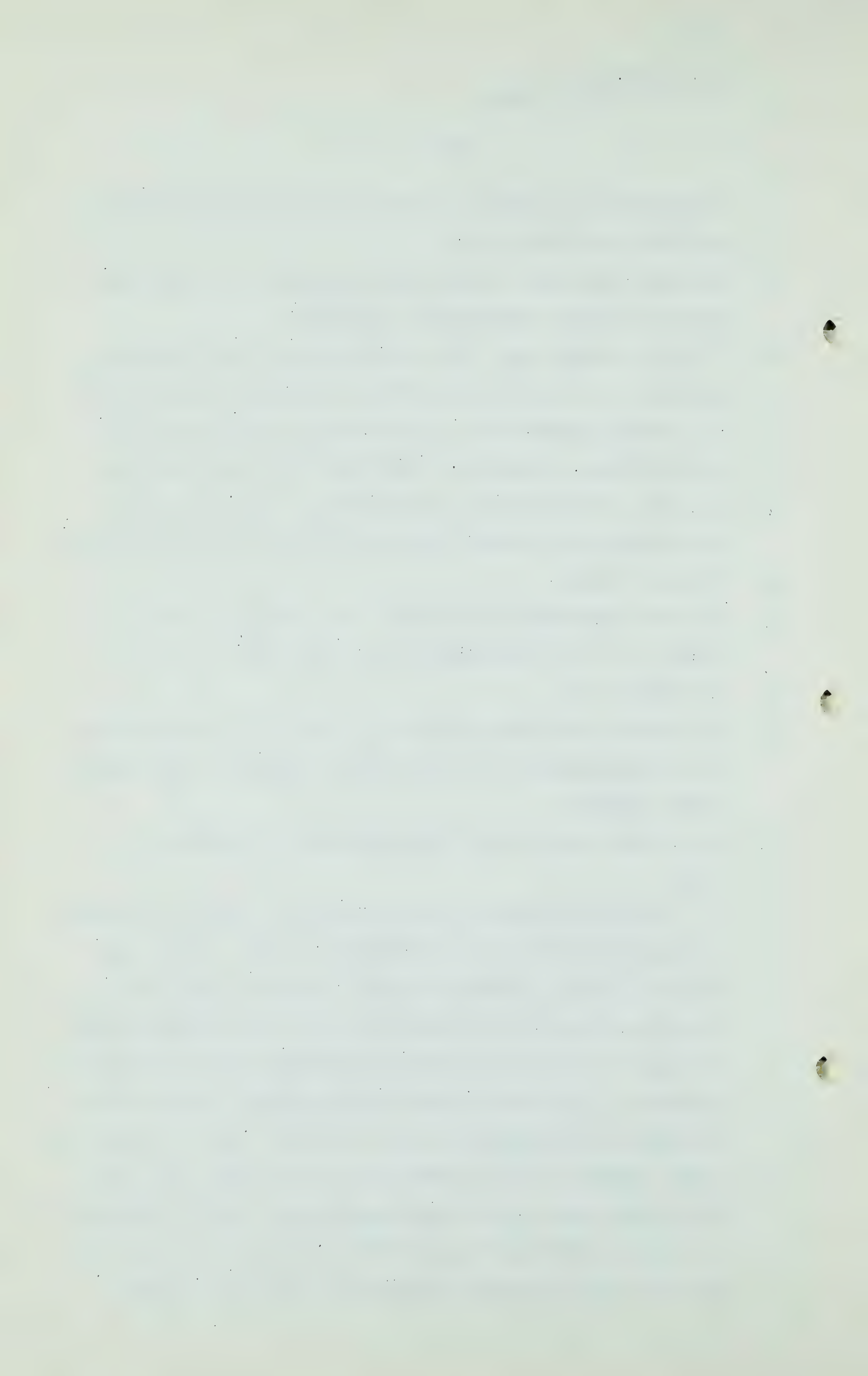
A Yes, these figures were taken from their exhibits.

Q Yes?

A Manufactured gas or butane-air gas is being distributed at present in Vancouver, Bellingham, Everett, Wenatchee, Spokane, Seattle, Tacoma, Olympia, Centralia, Chehalis, Longview, Kelso, Camas, Washougal and in the Portland area. This gas is used for domestic, commercial and some industrial purposes. The domestic uses include cooking, water heating, refrigeration and space heating. However, the use of gas for space heating has been limited due to its high cost. For this same reason, very little gas has been used in industry.

When natural gas is available, the commercial uses in the area will be greatly increased for baking, cooking,





F. W. Copp,  
Dir. Ex. by Mr. Nolan.

- 207 -

space heating, and for steam and hot water.

Industrial users of natural gas will include the generation of steam for food processing, pulp and paper manufacture, and general heating; in kilns for the manufacture of cement, lime, brick and tile; and as heat for melting, refining, forging, heat treating and annealing of metals. The companies will not sell natural gas for use as a raw material in the manufacture of chemicals in the United States.

The estimated annual market for the various routes in the fifth year of operation, based on gas being easily competitive on a price basis with fuel oil, are as follows:

FIFTH YEAR REQUIREMENTS - Mcf

	<u>Canada</u>	<u>U.S.</u>	<u>Total</u>
Route A	11,500,000	54,600,000	66,100,000
Route B	11,500,000	63,500,000	75,000,000
Route F	8,000,000	50,900,000	58,900,000

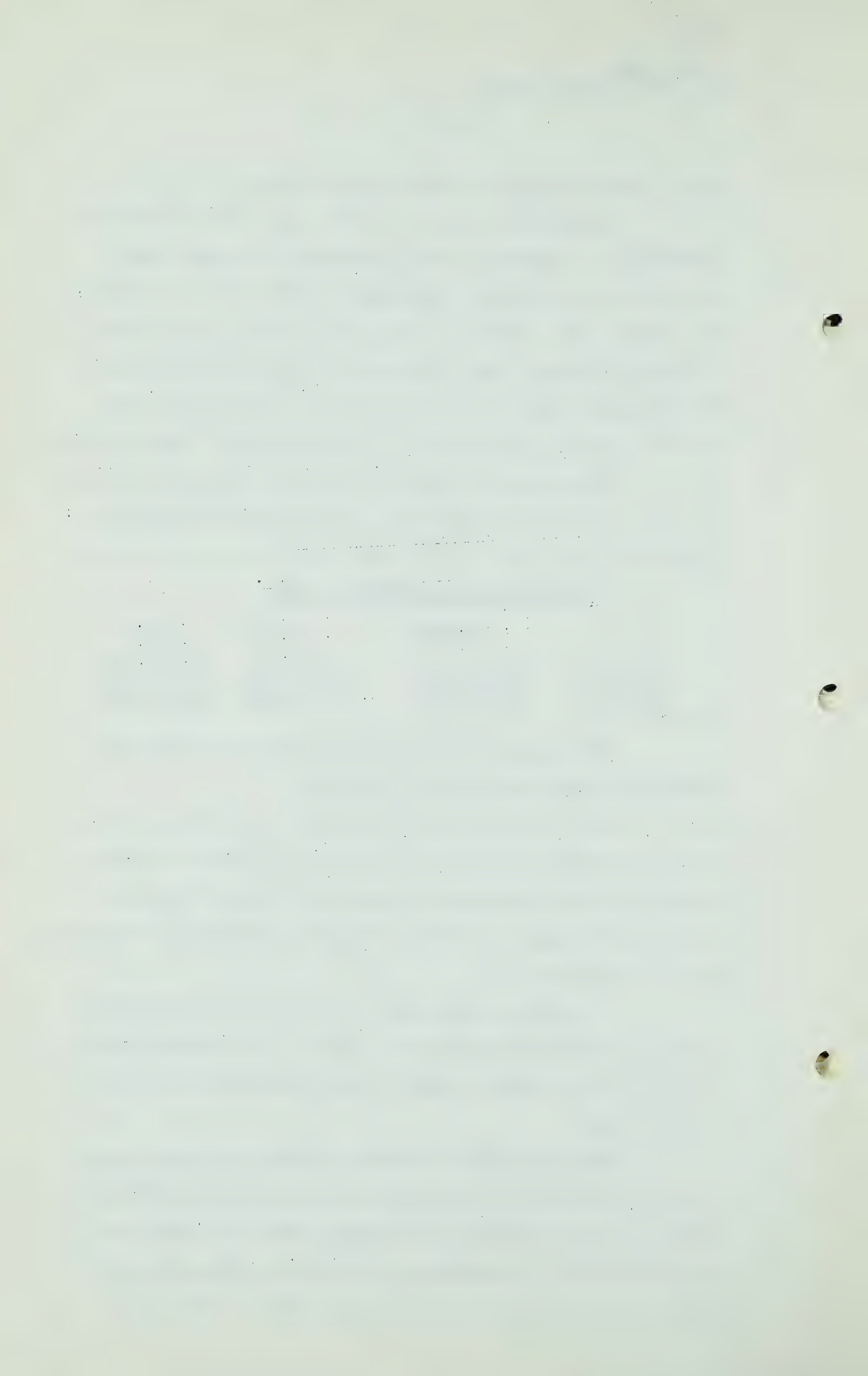
In the case of Route A, the Hanford Works and Wenatchee, Washington are not included.

In the case of Route F, these consumers, as well as The Consolidated Mining and Smelting Company of Canada, Limited, Fernie, Cranbrook, Kimberley, Nelson, Creston, Trail and Rossland in British Columbia and Spokane, Washington are not included.

In addition, the lower initial cost, lower operating and maintenance costs and higher load factor of Route B would make possible a better competitive price for industrial gas.

Estimates of the annual volumes of natural gas in the first and fifth years for Route B are shown on Table B. Table B is in the back of the report and it is entitled: Estimated Annual Requirements of Domestic, Commercial and Industrial Consumers for each Market Area. All of the





F. W. Copp,  
Dir. Ex. by Mr. Nolan.

- 208 -

figures here are in Mcf.s. They are divided for the first year of natural gas and the end of the fifth year of natural gas. They are also subdivided by classes of service for each of the communities that it is proposed to be served.

Q What is that column "Unaccounted for"?

A I think the name "Unaccounted for" is rather self-explanatory. It is usually a balancing figure between sales and purchases or sales and the manufacture of the gas. It includes leakages and adjustments in meter readings.

Q And the fuel for compression purposes?

A It includes also "use by the company".

Q Yes?

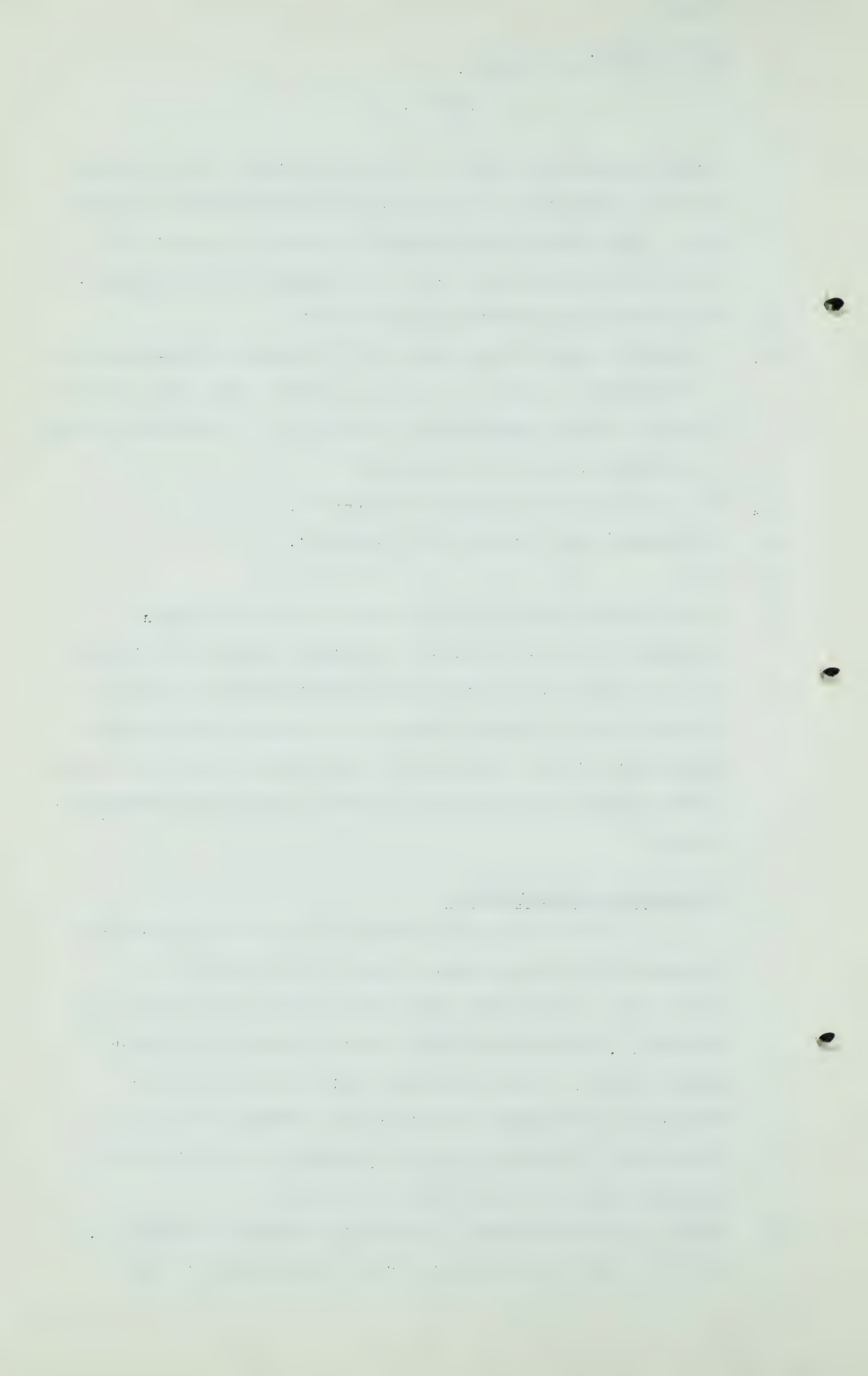
A These amounts include the gas that the distributing companies will resell and the estimated annual requirements of The Consolidated Mining and Smelting Company of Canada, Limited, and the Hanford Works of the United States Atomic Energy Commission. Information concerning these direct pipeline customers was furnished by their respective representatives.

#### Maximum Day Requirements

Maximum day requirements of the gas distributing companies have been summarized and shown in Table C. Table C is entitled "Estimated Maximum Day Requirements of Domestic, Commercial and Industrial Consumers for each Market Area." There again the figures are in Mcf.s. They are divided "End of First Year of Natural Gas" and Fifth Year. Further divided by classes of services which are set forth for each of the communities.

Q There is one item under the heading of British Columbia, which is described as being "Direct Industrial". That





F. W. Copp,  
Dir. Ex. by Mr. Nolan.

- 209 -

requires a word of explanation. I am speaking now of Table C. It is in the other ones too.

A The direct industrial customer included under British Columbia is the Consolidated Mining & Smelting Company of Canada. In Washington, it refers to the Hanford Works or the United States Atomic Energy Commission.

Q Thank you. This table you are referring to now, Table C, is made up in precisely the same way as Table A and Table B?

A That is correct.

Q All right.

A To these have been added the peak day requirements of the direct industrial consumers.

The load factor for the fifth year of natural gas operation is estimated to be 72 per cent using Route B and 65 per cent using Route A. In both cases it would be possible to increase these load factors by utilizing on the peak days the present liquefied petroleum gas facilities of the distributing companies which can be adapted to produce 1,000 Btu gas.

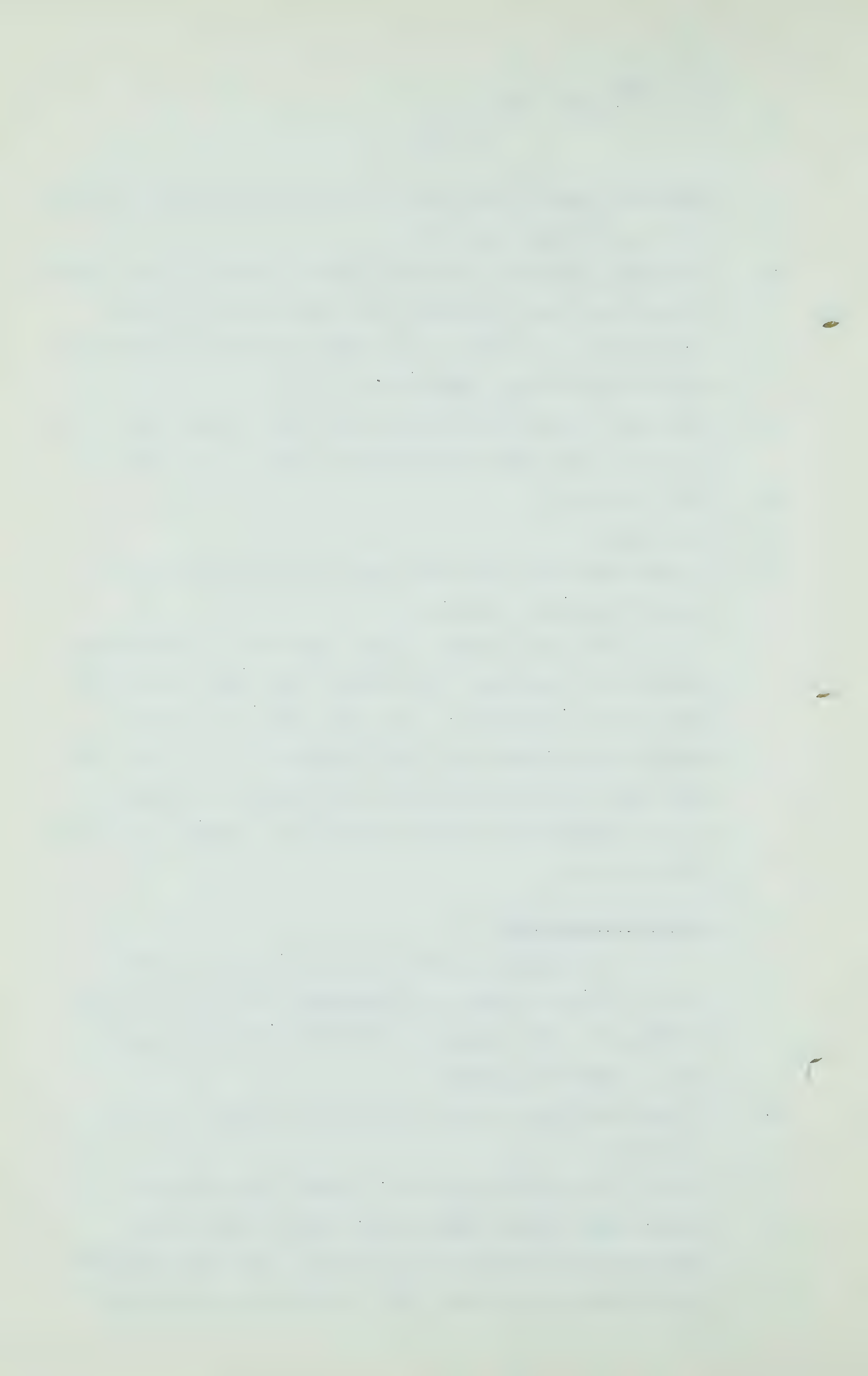
#### Climatic Conditions

Meteorological data for the proposed service area in British Columbia and Washington and Oregon is given in Table D. The heading of Table D is "Meteorological Data for Marketing Areas."

Q Is there anything you want to draw the attention of the Board to?

A It has five headings which are: Lowest Temperature on Record, Mean Minimum Temperature, Degree Days, Design Temperature and Estimated Load Factor. The Estimated Load Factor pertaining to that, that results from temperature





F. W. Copp,  
Dir. Ex. by Mr. Nolan.

- 210 -

and the heating load.

Q I know what lowest temperature means and mean minimum temperature but I have forgotten what degree days are. Would you tell me about that?

A It is all based on 65 degrees Fahrenheit and the number of days less than 65 is accumulated for the year and added and it becomes the figure shown in the third column.

Q What is "design temperature"?

A Design temperature is taken from the handbook or guide for heating, ventilating and air conditioning. It is a temperature used by architects in designing and also the design of distribution systems.

Q Yes, and how does this affect the estimated load factor?

A Well of course the temperature has a great bearing on both factors because of the heating load.

Q All right?

A The estimated load factor in relationship to temperature is included. These data were obtained from the distributing companies, Air Services, Meteorological Division, Department of Transport, Canada and U. S. Department of Commerce Weather Bureau.

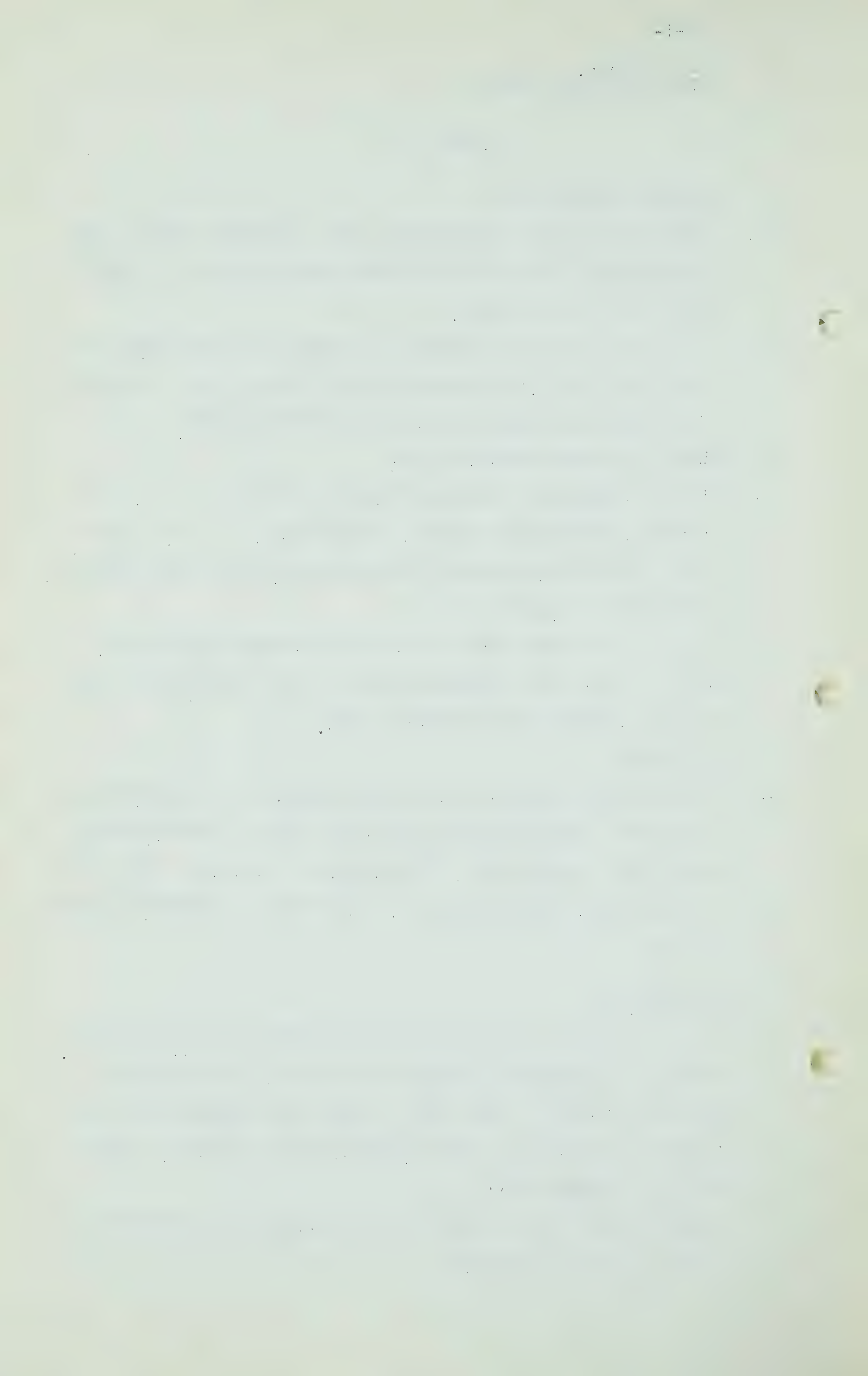
#### Other Fuels

Since 1939 the relative amounts of coal, fuel oil, wood and electricity consumed in this area have changed greatly. Prior to that time, sawdust and hogged fuel were important sources of energy along the North Pacific Coast.

Q What is "hogged fuel"?

A "Hogged fuel" is the refuse from sawmills. It consists of slabs, sawdust and bark.





F. W. Copp,  
Dir. Ex. by Mr. Nolan.

- 211 -

The use of wood and sawdust in the Vancouver area has declined since 1939, until at the present time it accounts for only 10 per cent of the total fuels, as shown on page 10 of the brief of the British Columbia Electric Company, Limited.

Q To be filed?

A That is correct. A similar reduction in the use of wood waste as fuel has taken place in Bellingham, Seattle and Spokane. More and more wood and sawdust are being withdrawn from the fuel market to be used as a raw material in manufacturing.

The principal fuel now used in the area to be served by the pipeline system is oil. The tabulation on page 12 of the brief of Seattle Gas Company shows that fuel oil now accounts for more than 60 per cent of the total fuel requirements, including electric energy, of the State of Washington.

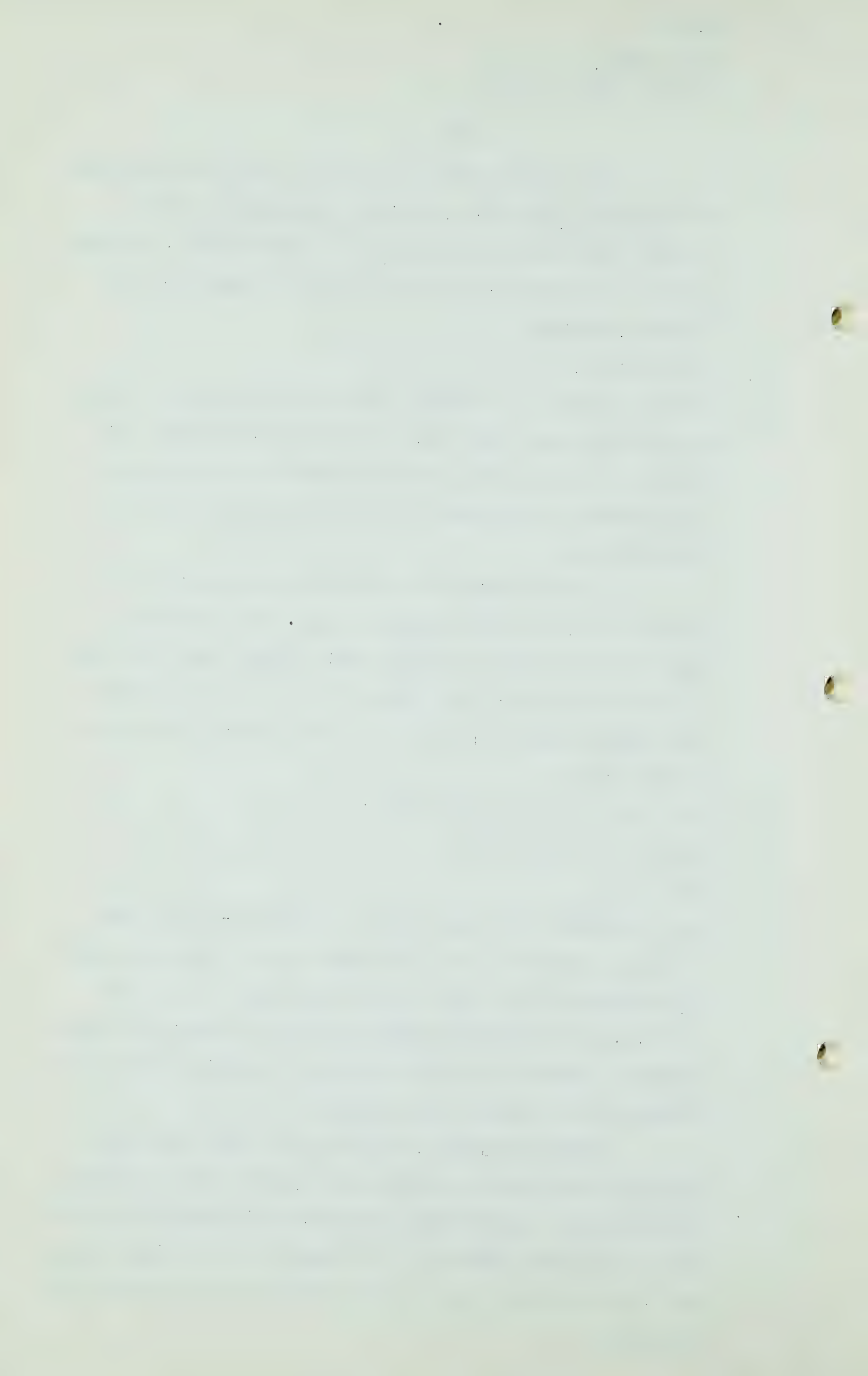
Q Where does that oil come from?

A Mostly from California.

Q Yes?

A The development of large amounts of hydro-electric power at Coulee, Bonneville and the Skagit plants, which has been given much publicity, has greatly increased the use of electricity for domestic purposes such as cooking and water heating. Expanded use of electricity is limited due to the present lack of generating capacity.

Practically all of the oil now used along the North Pacific Coast is delivered by tanker from California. This method of supply could easily be interrupted in time of war as was demonstrated on the Atlantic Coast in the recent war. A natural gas pipeline will assist in the security of this area.





F. W. Copp,  
Dir. Ex. by Mr. Nolan.

- 212 -

In order to be able to serve industrial markets, the price charged for natural gas must be competitive with the cost of other fuels. The following tabulation shows for fuel oil, coal and wood, the approximate equivalent prices per MCF of natural gas.

SUMMARY OF FUEL PRICES PER MILLION BTU

(Corresponding to prices per MCF of natural gas)  
April, 1950.

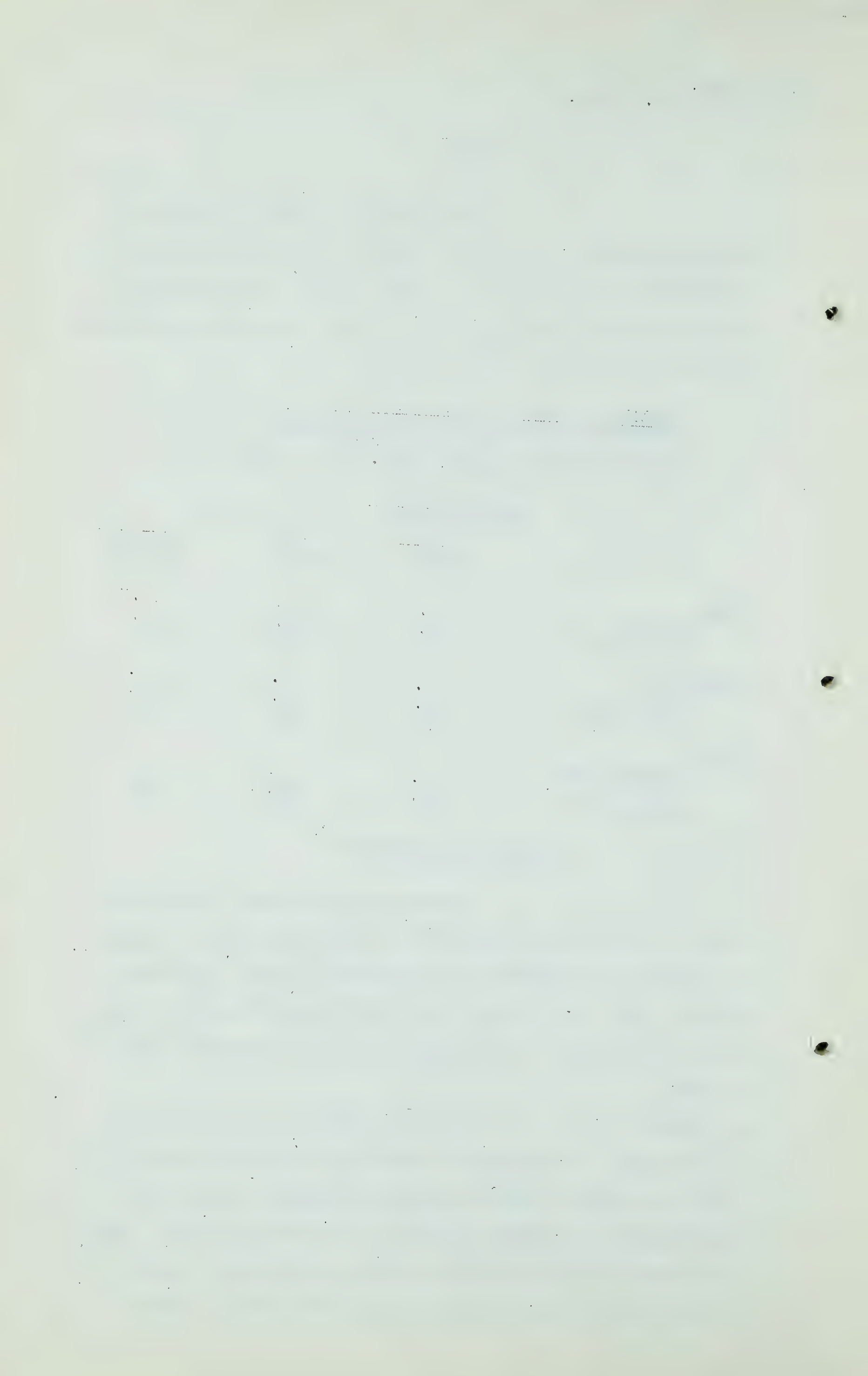
PACIFIC COAST

	<u>Canada</u> (1)	<u>U. S.</u>	<u>Spokane</u>
<u>COAL</u>			
Domestic	\$ .66	\$ .76	\$ .70
Industrial	.46	.65	.40
<u>FUEL OIL</u>			
Domestic	1.00	.80	1.04
Industrial	.43	.30	.49
<u>WOOD</u>			
Sawdust, cord			
and slab,	.33	.33	(2)
Hogged	.13	.13	

(1) Canadian Currency  
(2) Not available

Present price of heavy industrial fuel oil PS 400 and Bunker "C" in barge deliveries dockside at Portland and Seattle is approximately \$1.55 per barrel, May 11, 1950. For natural gas to be competitive with fuel oil at this price it would have to sell at about 25 cents per MCF.

MR. NOLAN: Now, with that brief introduction, Mr. Chairman, I would ask to have Mr. Copp stand down and I will proceed to call the other witnesses to whom I have made mention, it being understood, of course, that Mr. Copp will return to the stand to continue his evidence later. I would ask Mr. Mainwaring to come to the stand, please.



W. C. Mainwaring,  
Dir. Ex..by Mr. Nolan.

- 213 -

WILLIAM CROSSLEY MAINWARING, having  
been first duly sworn, examined by Mr. Nolan, testified as  
follows:

Q Mr. Mainwaring, what is your full name, please?

A William Crossley Mainwaring.

Q And what is your occupation?

A Vice President and Assistant to the President of British  
Columbia Electric Company Limited.

Q And will you tell me in a few words something of the nature  
and the operations of that company? By that I mean, where  
it is situate, what its purpose is, what area is served, and  
how long it has been in existence.

A Our company operates on what is known as the Lower Mainland  
of British Columbia, covering all of the area of Vancouver  
and New Westminster and the Fraser Valley and also on the  
southern end of Vancouver Island. We operate electric, gas  
and transportation utilities serving those areas exclusively.  
The company has been in operation as the British Columbia  
Electric Company for slightly over 50 years but our gas  
operation goes back some 80 years.

Q And what is the nature of your gas operation? You manufacture  
gas?

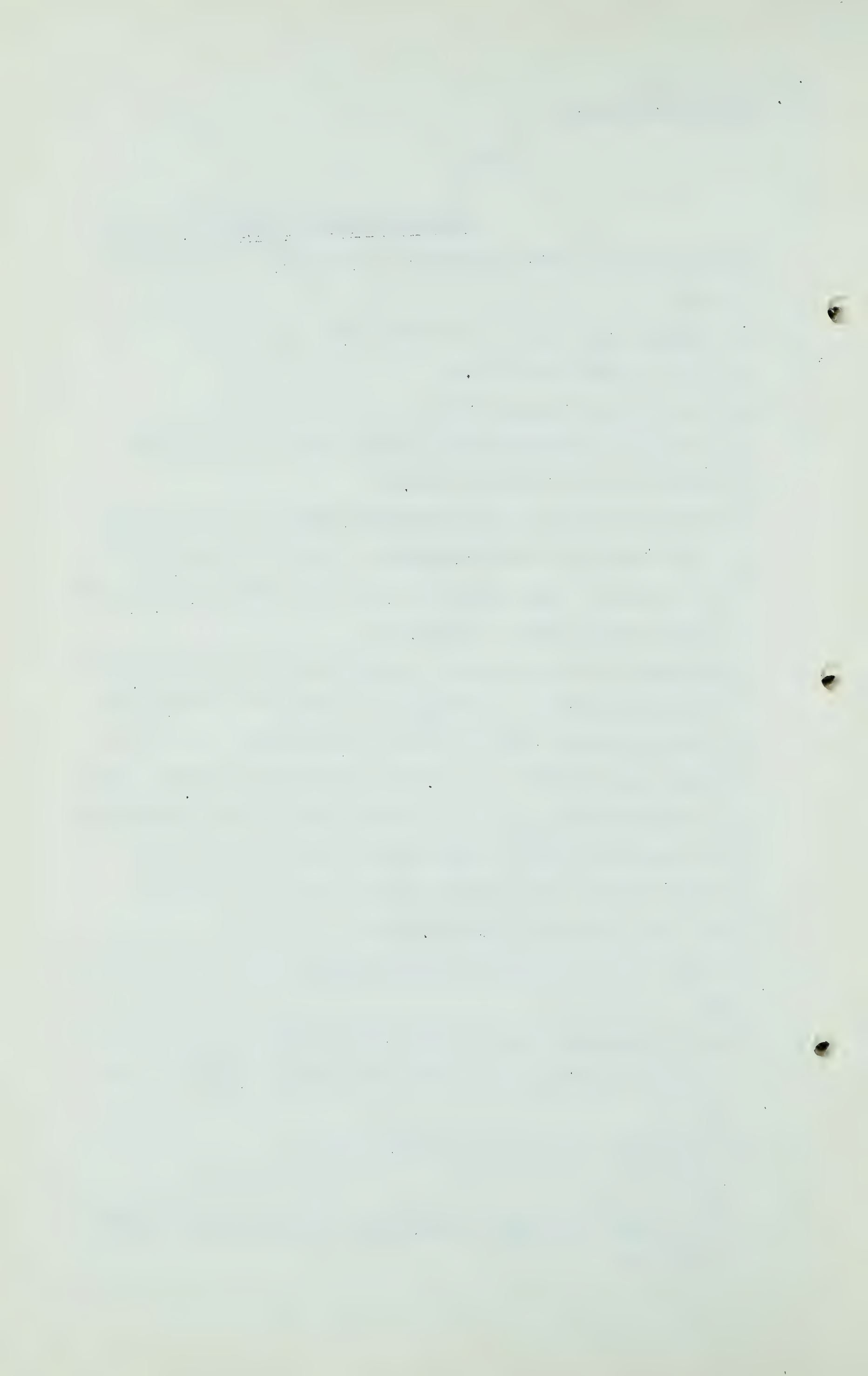
A Yes, we manufacture gas in the City of Vancouver for all of  
the Lower Mainland area of British Columbia using coal and  
oil.

Q You manufacture gas from coal and oil?

A Correct.

Q And you sell that gas to commercial, industrial and domestic  
consumers?





W. C. Mainwaring,  
Dir. Ex. by Mr. Nolan.

- 214 -

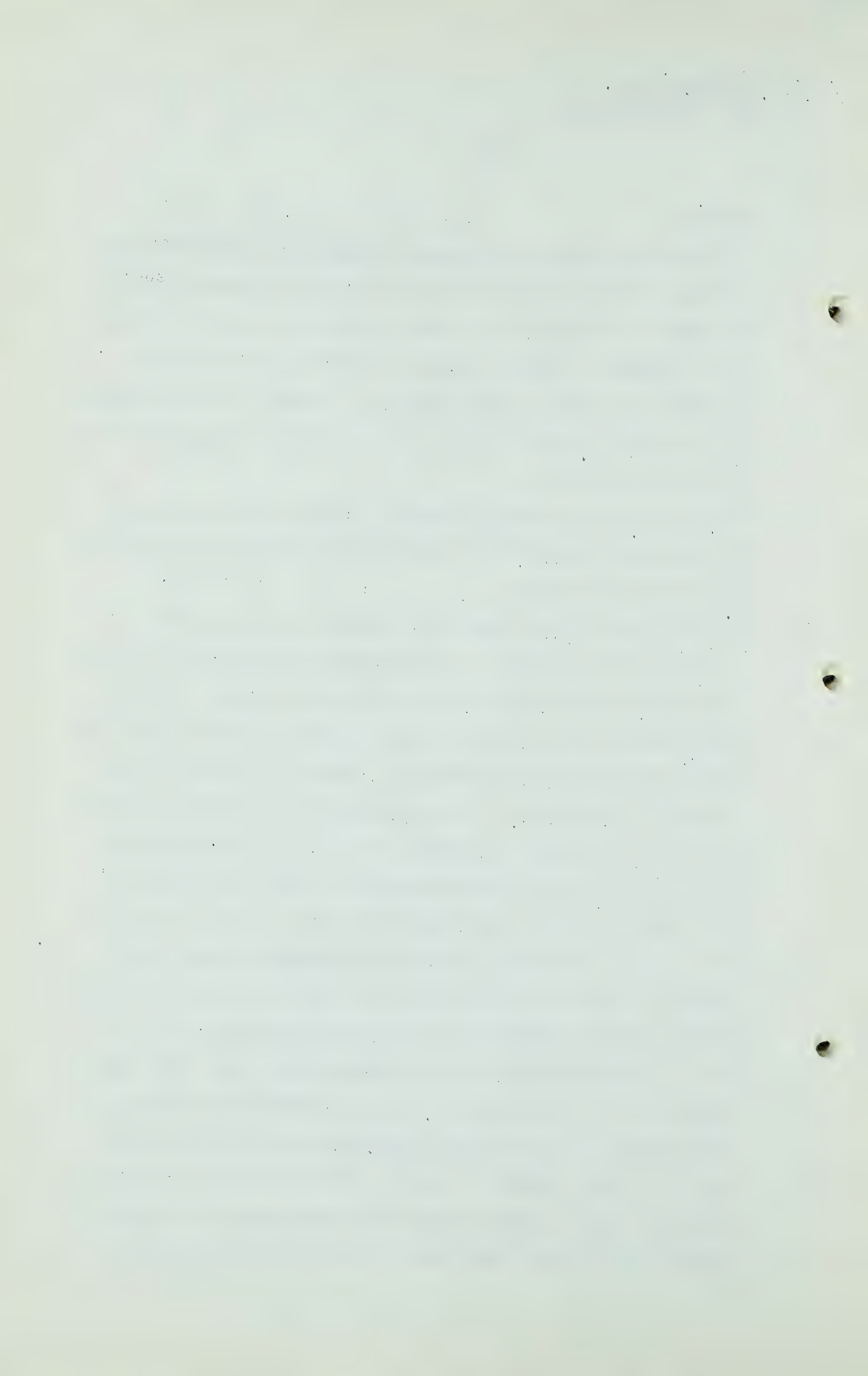
A Correct.

Q I understand that the applicant company here, the Northwest Company, has asked you to be good enough to come and make a statement to the Board of your company's position in respect of the import of natural gas to the Province of British Columbia, and that you are prepared to make such a statement?

A Yes, we were invited to do so and I am quite prepared to make such a statement.

Q Would you please be good enough to do so? This is not in writing, Mr. Mainwaring is simply going to give the Board the policy of his company.

A Mr. Chairman and Gentlemen, our company is interested, of course, in the purchase of natural gas from Alberta but there are certain conditions which we must see are met. In the first place, as a company, we must assure ourselves that the reserves of gas in the area that is going to supply us are adequate to take care of our requirements for a period of at least 20 or 25 years. Secondly, we must be satisfied that the company that is going to supply us, that is, the pipeline company, is in a position not only to build a pipeline but is able to maintain constant deliveries through that pipeline because we would have very limited storage facilities. Perhaps the most important of the conditions would be the price at which we are able to purchase this gas. The price would have to be competitive with the conditions existing in the area that we serve now, and which we anticipate would exist for some number of years. We must be able to supply industrial gas in competition with very cheap oil, and we must be able to sell that gas at a price that will enable





W. C. Mainwaring,  
Dir. Ex. by Mr. Nolan.  
Cr. Ex. by Mr. Fenerty.

- 215 -

our company to earn a fair return on the capital that we will have to invest to distribute this gas to our customers. That is a very simple statement of policy but it indicates our position.

Q Yes. Thank you very much.

MR. FENERTY: Is that all for this witness?

MR. NOLAN: Yes.

MR. FENERTY: There are a couple of questions.

I was not certain at the outset that Mr. Mainwaring was the man I wanted to ask.

MR. NOLAN: May I explain for the benefit of counsel that Mr. Davidson is here. Perhaps you will remember that he gave evidence before and I propose to call him.

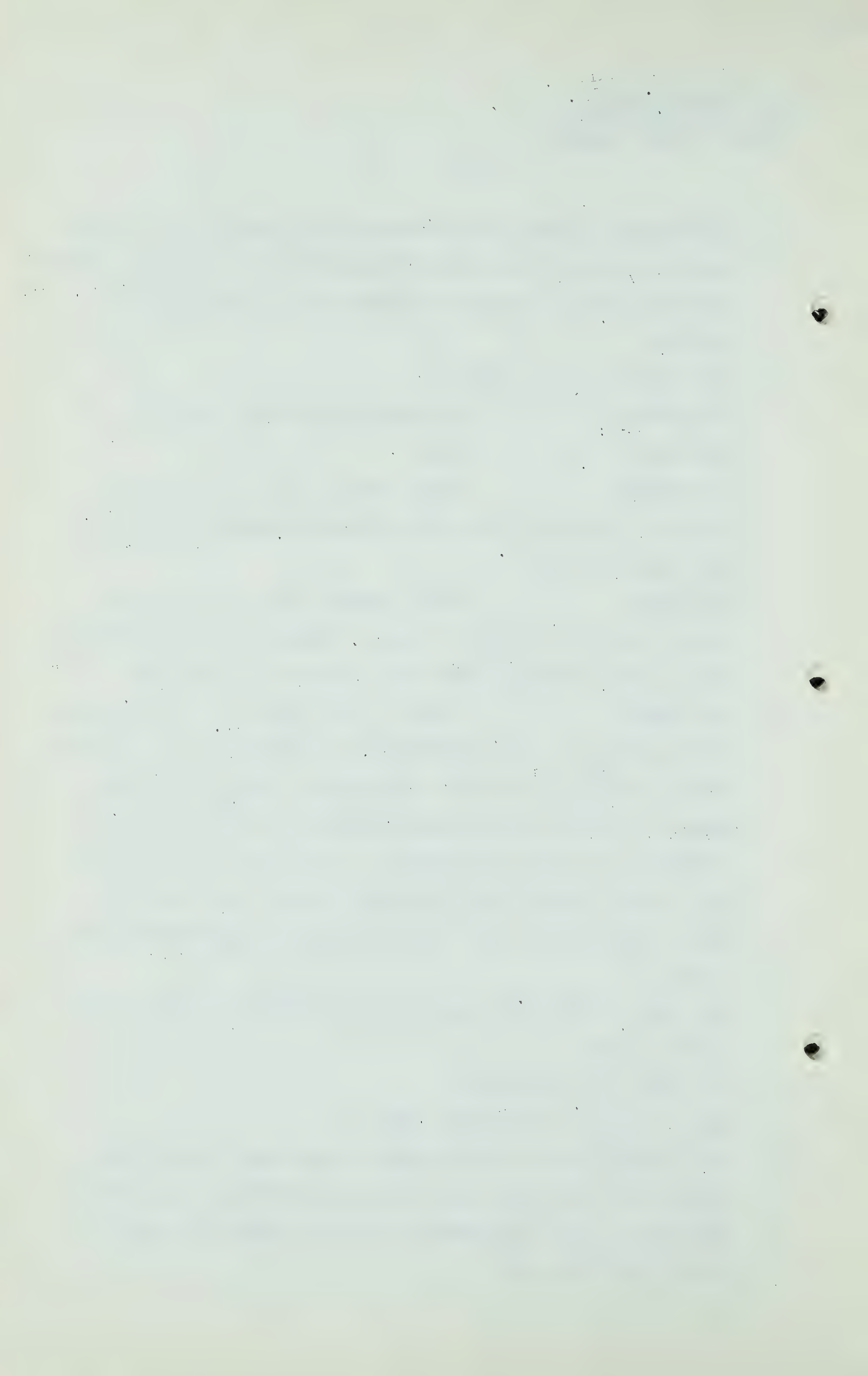
Q MR. FENERTY: Maybe I will find out. I should ask these questions of Mr. Mainwaring, it occurred to me, in view of his statement of policy, and perhaps I should ask him. Have you made any computation or has your company made any computation of the price which you would have to pay at your gate to the vendor of gas in order to meet the condition that you mentioned, fuel oil competition and manufacture and so on?

A Yes, and I believe Mr. Davidson could answer that when he is on the stand.

Q He is the one to ask that?

A That is right, Mr. Fenerty, yes.

Q And probably he would be the one to ask about the rate of return, the rate base relative to distribution factors and operating costs? Those would all come in what you would have to pay for gas?



W. C. Mainwaring,  
Cr. Ex. by Mr. Fenerty.

- 216 -

A Perhaps you would ask me about rate of return and rate base. Under our regulations in British Columbia our Public Utilities Commission allow us to earn 5.3%.

Q Are you able at this time to give me even a rough approximation of what your rate base would be as applied to natural gas operations?

A I think that is fairly difficult for me to answer at this time.

Q But you are going to have to do that in order to know what you are going to pay for gas, aren't you?

A Yes. Mr. Davidson might be able to answer that.

Q I see.

A If not, we would be quite pleased to provide the information to the Commission.

Q You have not as yet fixed on a price that you will have to pay for this gas in order to sell it competitively?

A We know what we can afford to pay. That will come out through Mr. Davidson.

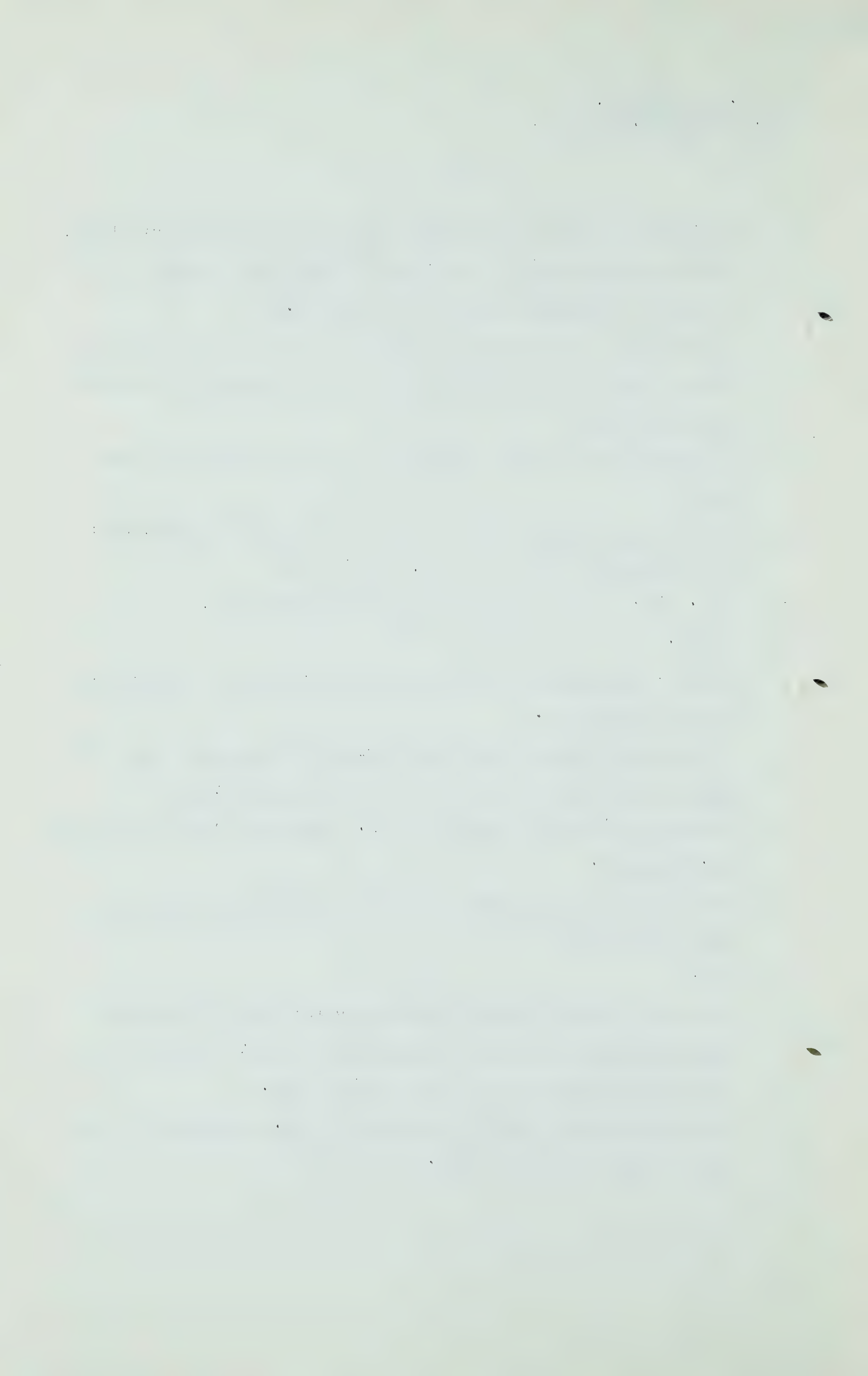
Q He can tell me about that because that involves your rate base and so on?

A Yes.

Q Is he the one to tell me also what price you will have to sell to manufacturers on a competitive basis? We know here it will have to be at the rate of 25 cents.

A Our position is slightly different but Mr. Davidson will be able to tell you about that.





W. C. Mainwaring,  
Cr. Ex. by Mr. S.B. Smith.  
Cr. Ex. by Mr. Fenerty.

- 217 -

CROSS-EXAMINATION BY MR. S.B. SMITH:

Q Mr. Bruce Robertson was here at the time of the presentation of the Westcoast application. He was asked whether your company was supporting the application of the Westcoast company. My recollection is he said your company was not, and that comparable position exists today because you are here and your company is presenting this brief. It does not mean that your company is supporting the application of the Northwest Gas Company?

A We are not supporting the application of any applicant.

Q Yes?

A We are independent purchasers of gas, we want to buy gas.

Q Providing you can do so under proper conditions?

A Correct.

Q In order to supply your consumers in British Columbia?

A That is right.

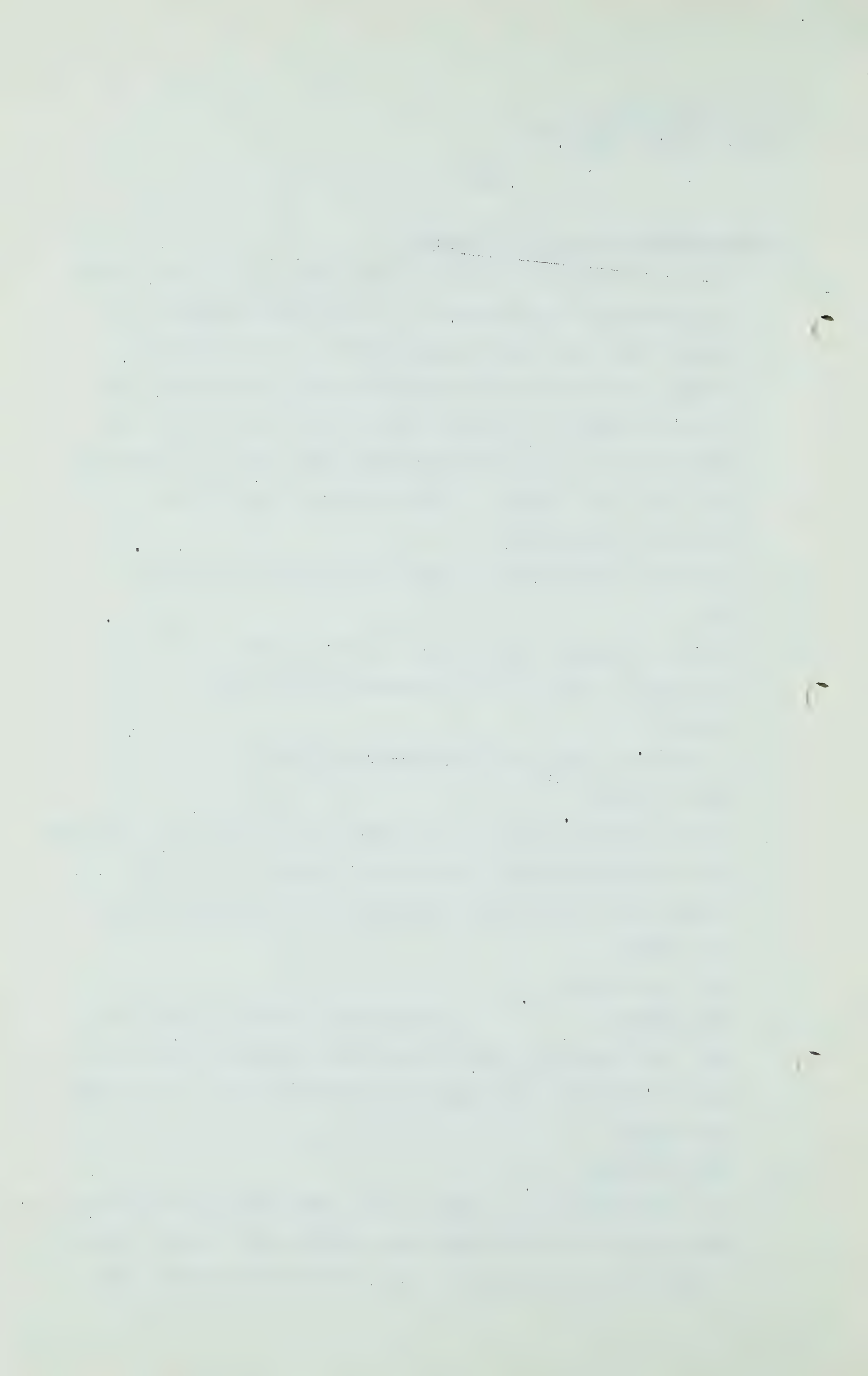
Q You are simply making a contribution here towards the material for the consideration of this Board completely impartial as between the companies who have applications pending before this Board?

A That is correct.

Q MR. FENERTY: One further question I forgot to ask. You mentioned, and I think very properly, that you must be assured of an adequate supply of from 20 to 25 years gas supply?

A That is right.

Q Do I understand you to mean by that you must have a call on what we call at least proven and probably gas supply, areas in the Province of Alberta, before you would consider the





W. C. Mainwaring,  
Cr. Ex. by Mr. Fenerty.

- 218 -

matter of purchasing Alberta gas?

A I am not sure that I understand your question, Mr. Fenerty.

Q You see, we have here an area that we all think is proven, we have here an area that we think is probable, and we hope will provide very large supplies, and we have another area, it is not too much to say we all hope will provide a tremendous amount of gas. When you say you must be assured of a supply, I am wanting to find out whether you are satisfied to take your chances on areas we hope will provide large amounts of gas, or do you want to be shown there are contracts covering proven areas?

A Well, I think our position in that respect is going to rest to a great extent on the findings of this Board when the Hearings are through.

Q You are satisfied with whatever area this Board allocates for your supply, are you?

A That is not what I stated.

Q That is not what I asked you either, but you answered, so there we are. That is where we get when we do not answer the questions. Now, I will ask you again. We have got what we call proven areas, and we think it is a policy of the Government and we feel, we hope, it is a policy of the Board, that local consumption will be protected as to proven areas. Now I say, would you expect an assured supply will come from -- in order to be assured for 25 years, are you willing to take chances or take it from proven areas?

A I think we are quite prepared to take a certain amount of chance on the gas that will be developed in the probable areas.



W. C. Mainwaring,  
Cr. Ex. by Mr. Fenerty.  
Cr. Ex. by Mr. C.E. Smith.

- 219 -

Q You are willing to?

A Yes.

Q Now then, you expect your vendors to show you firm contracts for gas, and you will be satisfied if those contracts are partly in proven areas and partly in undeveloped areas, are you?

A That is standard practice, yes.

Q That is the practice?

A Yes.

Q That is fine. That is what I was anxious to know.

CROSS-EXAMINATION BY MR. C.E. SMITH:

Q I have one question, if nobody else has, sir. Mr. Mainwaring, I suppose you know this application is presented to this Board under the Act of this Province called the Gas Resources Preservation Act?

A Yes.

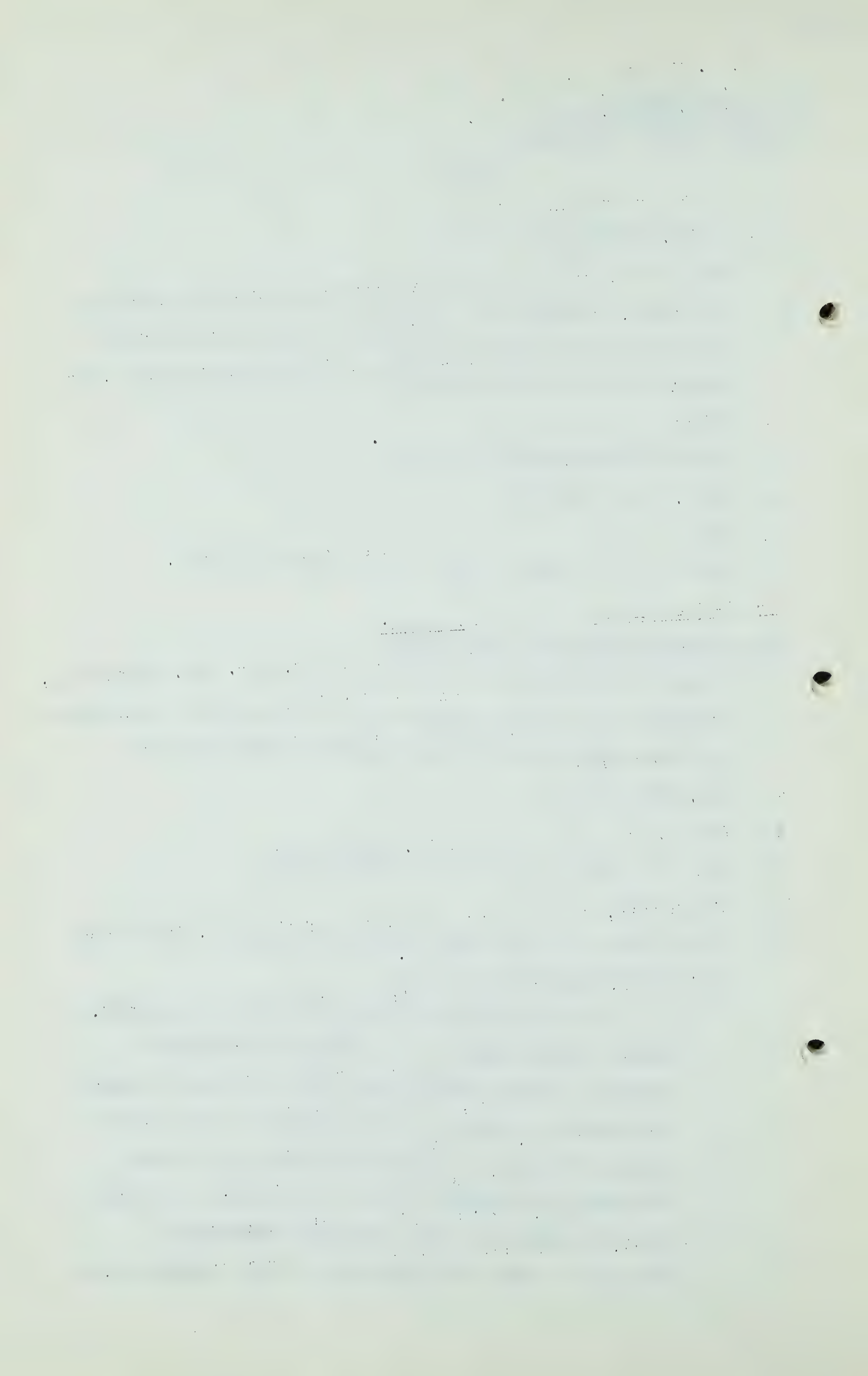
Q You have probably read it, Mr. Mainwaring?

A Yes, I have.

Q If you have, you have read Section 9 of this Act, but I may be permitted to read it to you:

" 9. Notwithstanding the provisions of any permit, where, in the opinion of the Board, an emergency occurs or other circumstances arise by reason of which it becomes necessary, in the interests of the people of the Province, to provide additional gas to meet the needs of consumers within the Province, the Board, with the approval of the Lieutenant Governor in Council, to meet the emergency of other circumstances,





W. C. Mainwaring,  
Cr. Ex. by Mr. C.E. Smith.

- 220 -

"may make an order requiring the diversion of all or any portion of the gas to which a permittee is entitled under his permit to consumers within the Province for use and consumption within the Province for such period as the Board may order."

If, by any chance, it became necessary for the Board and the Lieutenant Governor in Council to exercise their powers under Section 9, have you given consideration to the position you possibly might be in in that event? Do you follow me?

A I follow you quite clearly, yes. We would just simply have to take a chance under that clause, we have not any alternative, we have to accept it.

Q All I want to know is, you have considered that clause rather carefully, have you?

A That is right, we have.

Q It gives the Lieutenant Governor in Council through the Board pretty extensive powers to protect us?

A Yes.

Q It may leave you some day without shaving water or bath water?

A It is a protection the people of Alberta must have.

Q You have considered it quite carefully?

A We have.

Q Along with the other things?

A That is right.

MR. NOLAN: I would direct the attention of the Board and counsel to the brief entitled "British Columbia Electric Company Limited."

1911

1911

1911

1911

1911

1911

1911

1911

1911

1911

1911

1911

1911

1911

1911

1911

1911

1911

1911

1911

1911

1911



R. S. Davidson,  
Dir. Ex. by Mr. Nolan.

- 221 -

RICHARD SMITH DAVIDSON, having  
been first duly sworn, examined by Mr. Nolan, testified as follows:

Q Mr. Davidson, you are connected with the British Columbia  
Electric Company?

A That is correct.

Q And you are an industrial analyst?

A Yes.

Q And you appeared before this Board in the month of February,  
1950?

A That is correct.

Q And gave evidence on the application of the Westcoast Trans-  
mission Company?

A Yes, sir.

Q At that time you prepared a report which was filed as an  
exhibit on that application?

A That is correct. It was read before the Board.

Q You were requested by the applicant in this case now to  
prepare a report of the situation in British Columbia, and  
you did so?

A That is the same report.

Q Now, is there any change made in the report that you have  
provided us with and the report that you prepared on the  
Westcoast Transmission application?

A It is the same report as I read in February before the Board.

Q Are the circumstances the same today as they were then?

A Yes.

Q And is there anything that you wish to add to what you said  
in your report used on the Westcoast Transmission application?

A No, there would be no changes.

THE UNITED STATES OF AMERICA

1911

IN SENATE

COMMITTEE ON THE INTERIOR

REPORT OF THE COMMISSIONER OF THE GENERAL LAND OFFICE

IN RESPONSE TO A RESOLUTION PASSED BY THE SENATE

APRIL 1, 1911

WASHINGTON

GOVERNMENT PRINTING OFFICE

1911

THE UNITED STATES OF AMERICA

IN SENATE

COMMITTEE ON THE INTERIOR

REPORT OF THE COMMISSIONER OF THE GENERAL LAND OFFICE

IN RESPONSE TO A RESOLUTION PASSED BY THE SENATE

APRIL 1, 1911

WASHINGTON

GOVERNMENT PRINTING OFFICE

1911

R. S. Davidson,  
Dir. Ex. by Mr. Nolan.

- 222 -

Q And that presents some difficulty to me, sir. You have had as recently as February this report placed in evidence before the Board. Now, I know there are some counsel here who were not present on that application, but this particular exhibit, being No. 6, has been circulated for some time and has been in the hands of all counsel who are here, so that while I have not discussed this with counsel for the Board, it seems to me that we would serve no useful purpose by reading this document again because it is the same as the earlier one and the situation has not changed in the meantime. Mr. Fenerty has moved, sir, that it be taken as read. I second that motion and there being no one to the contrary, may I consider it passed?

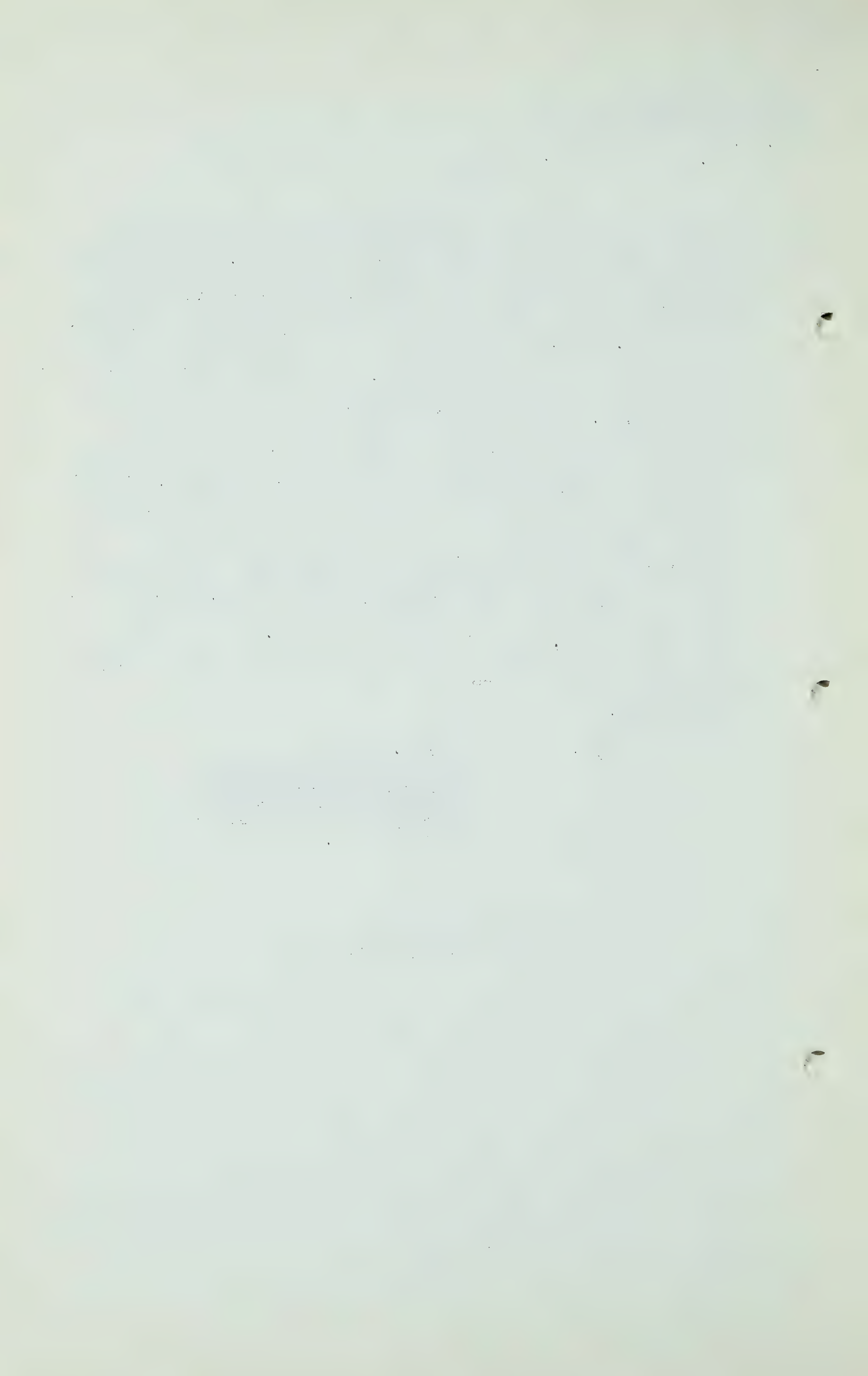
THE CHAIRMAN:

Yes.

BRIEF PREPARED BY THE  
BRITISH COLUMBIA ELECTRIC  
COMPANY LIMITED MARKED  
EXHIBIT 6.

(Go to page 223)





R. S. Davidson,  
Dir. Ex. by Mr. Nolan

- 223 -

MR. NOLAN: Well, then, sir, there are just one or two things I am going to ask Mr. Davidson, and then he will be ready for cross-examination. It is understood, of course, that this brief is to be incorporated into the record in my application, because I want all the evidence adduced by me to be present in the transcript on this Hearing.

TO THE PETROLEUM AND NATURAL GAS  
CONSERVATION BOARD, CALGARY, ALBERTA

THIS BRIEF IS PRESENTED BY  
BRITISH COLUMBIA ELECTRIC COMPANY LIMITED  
OF 425 CARRALL STREET, VANCOUVER  
BRITISH COLUMBIA

I N T R O D U C T I O N

The introduction of natural gas, through transmission pipeline to the lower mainland of the Canadian Pacific Coast, would add another commodity in the area to the sources of power and fuel. The main sources presently consist of wood, coal, hydro-electric energy and imported petroleum.

The purpose of this brief is to estimate the market potentialities of natural gas in the Metropolitan Vancouver area, British Columbia.

In it:

1. Statistical data are presented, relevant to estimating the market for natural gas, dealing with population growth, industry, manufactures and housing.
2. Historical statistics of the fuel consumption of the Province and consumption trends are examined.
3. An estimate of the present fuel requirements of the Metropolitan Vancouver area is presented.
4. Data of the present operation of the British

100

100

100

100

100



R. S. Davison,  
Dir. Ex. by Mr. Nolan

- 224 -

Columbia Electric Company Limited in manufacturing and distributing gas are given.

5. The markets for natural gas are estimated in the area and these data are presented for the first full year of natural gas and the four succeeding years.

### P A R T I

#### THE ECONOMY OF BRITISH COLUMBIA

#### RESOURCES AND INDUSTRY

The main resources of British Columbia include its timber, fish, metallic and non-metallic minerals and water power. The cities of Vancouver and New Westminster are seaports and the development of these resources has been materially aided by their geographical location on international trade routes. This has resulted in the building of the basic industries of logging, fishing, mining, and the basic manufacturing industries of lumber, pulp and paper, fish packing, metallurgical works, etc., together with ancillary manufactures to serve this industrial development and the needs of expanding seaports.

The agricultural development in the Province is small and its people are dependent to a great extent on imported agricultural products.

The relative importance of each segment of primary and secondary industry for the year 1947 is illustrated in the following table.



R.S.Davidson,  
Dir.Ex. by Mr. Nolan

- 225 -

<u>Industry</u>	<u>Net Value of Production</u>	<u>Percentage Distribution of Value</u>
<u>Primary</u>	\$	
Agriculture	71,541,000	9.3
Forestry	242,266,466	31.5
Fisheries	51,451,168	6.7
Trapping	1,616,529	0.2
Mining	97,781,055	12.7
Electric Power	16,173,272	2.1
<u>Secondary</u>		
Construction	68,780,649	8.9
Custom and Repair	22,203,000	2.9
Manufactures	388,702,178	50.5
Total	960,515,317	124.8
Less Duplication	-191,123,167	-24.8
Grand Total	769,392,150	100.0

Source: Dominion Bureau of Statistics  
Survey of Production 1947

#### MANUFACTURES OF BRITISH COLUMBIA

The census of the manufacturing industry for 1947 by the Dominion Bureau of Statistics tabulates 3,020 manufacturing industries in British Columbia with a gross value of production of \$858,285,000 and the employment of 83,200 persons. The distribution of manufactures by the nine main groups is as follows:

<u>Manufactures Group</u>	<u>Gross Value of Production</u>
Vegetable Products	\$ 116,993,000
Animal Products	115,361,000
Textile Products	11,683,000
Wood & Paper Products	374,049,000
Iron & Steel Products	80,546,000
Non Ferrous Metal Products	86,358,000
Non Metallic Mineral	33,587,000
Chemical	35,818,000
Miscellaneous	3,890,000
Total	\$ 858,285,000

Source: Dominion Bureau of Statistics  
Census of Industry - 1947.





R. S. Davidson,  
Dir. Ex.by Mr. Nolan

- 225a-

### MANUFACTURES OF METROPOLITAN VANCOUVER

The value of manufacturing production in the Metropolitan Vancouver area amounted to 52.2% of the provincial total. This manufacturing production plus the manufacturing of the Fraser Valley amounted to 63.2% of the provincial total.

### LABOUR FORCE

The labour force of British Columbia at June 1949 was estimated by the Dominion Bureau of Statistics to be 450,000 persons 14 years of age and over, made up as follows:

Agricultural Labour Force	39,000	or	8.7%
Non-agricultural Labour Force	<u>411,000</u>	or	<u>91.3%</u>
	<u>450,000</u>		<u>100.0%</u>

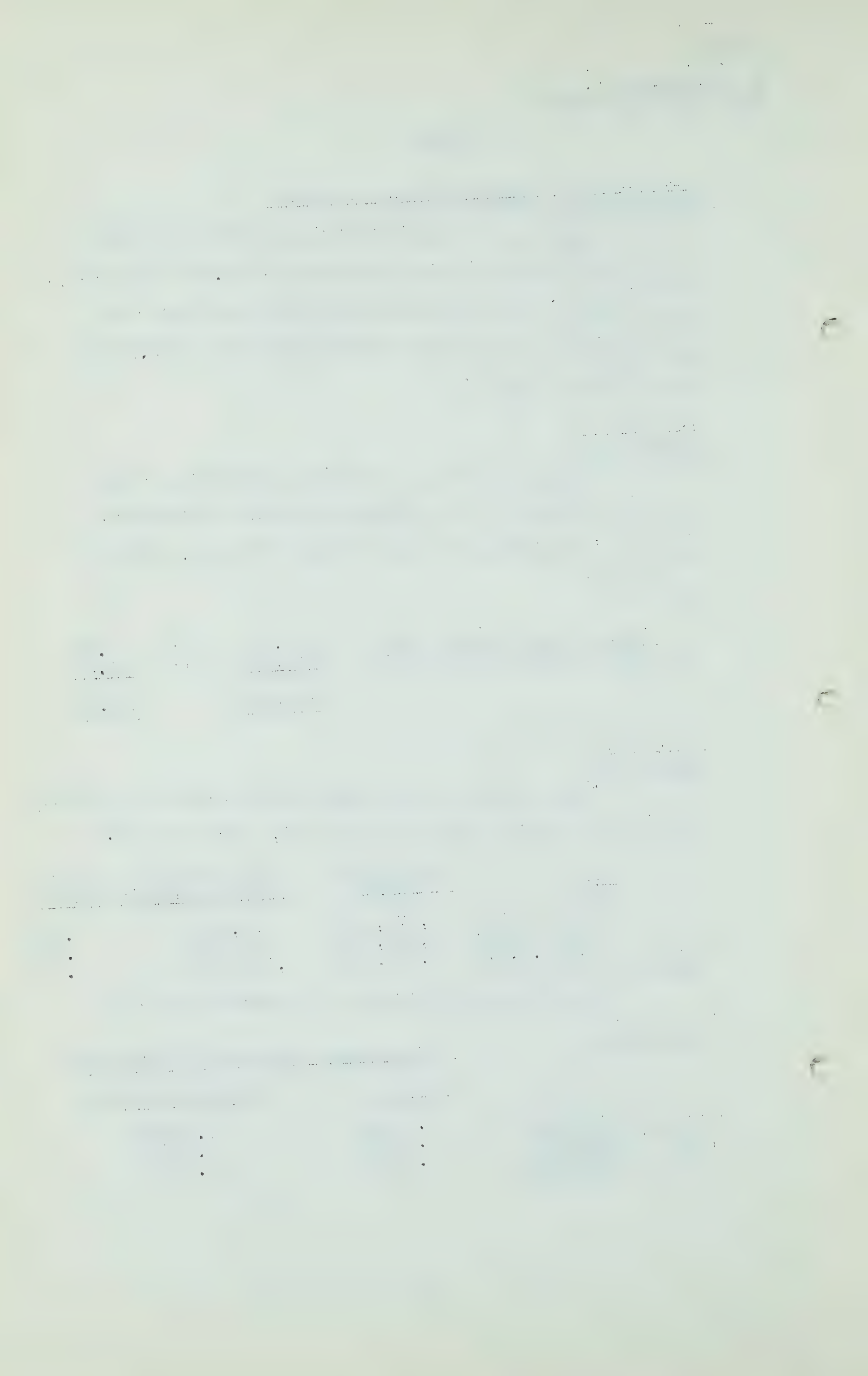
### POPULATION

The following table shows the population for Canada and British Columbia for the years 1931, 1941 and 1949:

<u>Year</u>	<u>Population Canada</u>	<u>Population British Columbia</u>	<u>% of Canada</u>
1931 (Census)	10,376,000	694,000	6.7%
1941 (Census)	11,507,000	818,000	7.1%
Estimate 1949 (D.B.S.)	13,545,000	1,114,000	8.2%

The percentage increase is illustrated by the following:

		<u>Percentage Increase in Population</u>	
		<u>Canada</u>	<u>British Columbia</u>
Years	1931-1941	10.89%	17.86%
"	1941-1949	17.13%	40.65%
"	1931-1949	30.50%	60.50%





R.S.Davidson,  
Dir.Ex. by Mr. Nolan

- 226 -

### POPULATION OF METROPOLITAN VANCOUVER

The area of Metropolitan Vancouver is described by the Dominion Bureau of Statistics as being the Cities of Vancouver, North Vancouver and New Westminster; the District Municipalities of Burnaby, West Vancouver and North Vancouver and the University Endowment Area. The population of the area by the 1941 D.B.S. Census and in 1948 by the Provincial Government estimate is as follows:-

<u>Area</u>	<u>Population Census 1941</u>	<u>Population 1948 Provincial Govt. Estimate</u>	<u>Percentage Increase</u>
Cities of -			
Vancouver	275,353	376,000	36.6
North Vancouver	8,914	13,000	45.8
New Westminster	21,967	34,000	54.8
Districts of -			
Burnaby	30,328	48,000	58.3
North Vancouver	5,931	10,000	68.6
West Vancouver	8,362	11,000	31.5
University Area	<u>636</u>	<u>1,200</u>	<u>88.7</u>
Total	351,491	493,200	40.3%

### POPULATION OF THE FRASER VALLEY

To the south and east of Metropolitan Vancouver lies an area known as the lower Fraser Valley; consisting of municipalities, towns and villages situated on the north and south sides of the Fraser River. This area, roughly 60 miles long by 30 miles wide, had in 1948 an estimated population of 140,000. Thus Metropolitan Vancouver and the adjacent Fraser Valley had in 1948 a population of 632,000 or 58.5 per cent of 1,082,000, the provincial total.

The foregoing statistics of manufacturing and population indicate the extent of the concentration of business, trade and industry in a very small area known as the "Lower Mainland."

1. The first part of the paper

is devoted to a discussion of the  
general principles of the theory  
of the subject. It is shown that  
the theory is based on the  
assumption that the system is  
in a state of equilibrium.

The second part of the paper  
is devoted to a discussion of the  
application of the theory to the  
case of a system of particles.  
It is shown that the theory  
can be applied to a system of  
particles in a state of equilibrium.

2. The second part of the paper

is devoted to a discussion of the  
application of the theory to the  
case of a system of particles.  
It is shown that the theory  
can be applied to a system of  
particles in a state of equilibrium.

The third part of the paper  
is devoted to a discussion of the  
application of the theory to the  
case of a system of particles.

R. S. Davidson,  
Dir.Ex. by Mr. Nolan.

- 227 -

## HOUSING STATISTICS

### NUMBER OF HOUSEHOLDS

In addition to the 1941 Census of Housing, the Dominion Bureau of Statistics has made estimates of households in Canada during 1947 and 1948. The following table indicates the comparative increase in B.C. with the national figures:

<u>Year</u>	<u>Canada</u>		<u>British Columbia</u>	
	<u>No. of Households</u>	<u>% Increase Since 1941</u>	<u>No. of Households</u>	<u>% Increase Since 1941</u>
1941	2,706,089		236,047	
1947	3,128,000	15.6	315,000	33.4
1948	3,235,000	19.5	337,000	42.8

Source: Dominion Bureau of Statistics  
Estimates of Households and  
Families in Canada, 1947-1948.  
Census of Housing 1941.

### CONSTRUCTION OF DWELLINGS

The population of British Columbia is 8.2 per cent and Metropolitan Vancouver 3.8 percent of the national total. The following figures indicate the volume of construction of dwellings necessary to accommodate the rapidly increasing population.

	<u>Canada</u>	<u>Housing Completions</u>		<u>Metropolitan Vancouver</u>	<u>% of Canada</u>
	<u>No. of Completions</u>	<u>British Columbia</u>	<u>% of Canada</u>		
		<u>No. of Completions</u>		<u>No. of Completions</u>	
1948	76,097	10,731	14.1%	6,758	8.9%
1949 (7 mos.)	46,312	5,709	12.4%	3,261	7.1%

Source: Dominion Bureau of Statistics  
Housing Bulletins.





OWNER-OCCUPIED AND NUMBER OF SINGLE DWELLINGS

Important to the consideration of the market for natural gas are the statistics of ownership of dwellings and the type of dwellings in the market area. The figures in the following table show that Metropolitan Vancouver is more readily adaptable to the use of natural gas for domestic purposes than other metropolitan areas in Canada.

<u>Metropolitan Area</u>	<u>No. of Dwellings</u>	<u>Percentage of Owner Occupied Dwellings</u>	<u>Percentage of Single Dwellings</u>
Vancouver	92,782	53.7	75.2
Winnipeg	65,353	48.2	65.8
Toronto	207,665	46.0	36.9
Hamilton	41,779	45.0	73.8
Montreal	249,560	15.0	6.9
Quebec	34,405	25.4	14.3

Source: Dominion Bureau of Statistics  
Census of Housing 1941.

HEATING FUELS USED IN DWELLINGS

The following table gives the numerical and percentage distribution of dwellings in B.C, by principal heating fuels. The figures are from the Census June 1941, and from a special survey of household facilities taken in August 1947.

<u>Fuel</u>	<u>Principal Heating Fuels</u> <u>Occupied Dwellings 1941 Census</u>		<u>Heating Facilities in B.C.</u> <u>Homes - Area Sampling 1947</u>	
	<u>No. of Dwellings</u>	<u>% Distribution</u>	<u>No. of Dwellings</u>	<u>% Distribution</u>
Coal & Coke	41,275	18.7%	155,000	49%
Fuel Oil	13,889	6.3%	38,000	12%
Wood & Sawdust	163,596	74.2%	118,000	37%
Gas	1,122	0.5%	★ 6,000	2%
Electricity	683	0.5%		
	220,565	100.0%	317,000	100%

★ Too small to sample.





R.S.Davidson  
Dir.Ex. by Mr. Nolan

- 229 -

Source: Dominion Bureau of Statistics  
Housing Census 1941  
Heating Facilities in Canadian  
Homes August 1947.

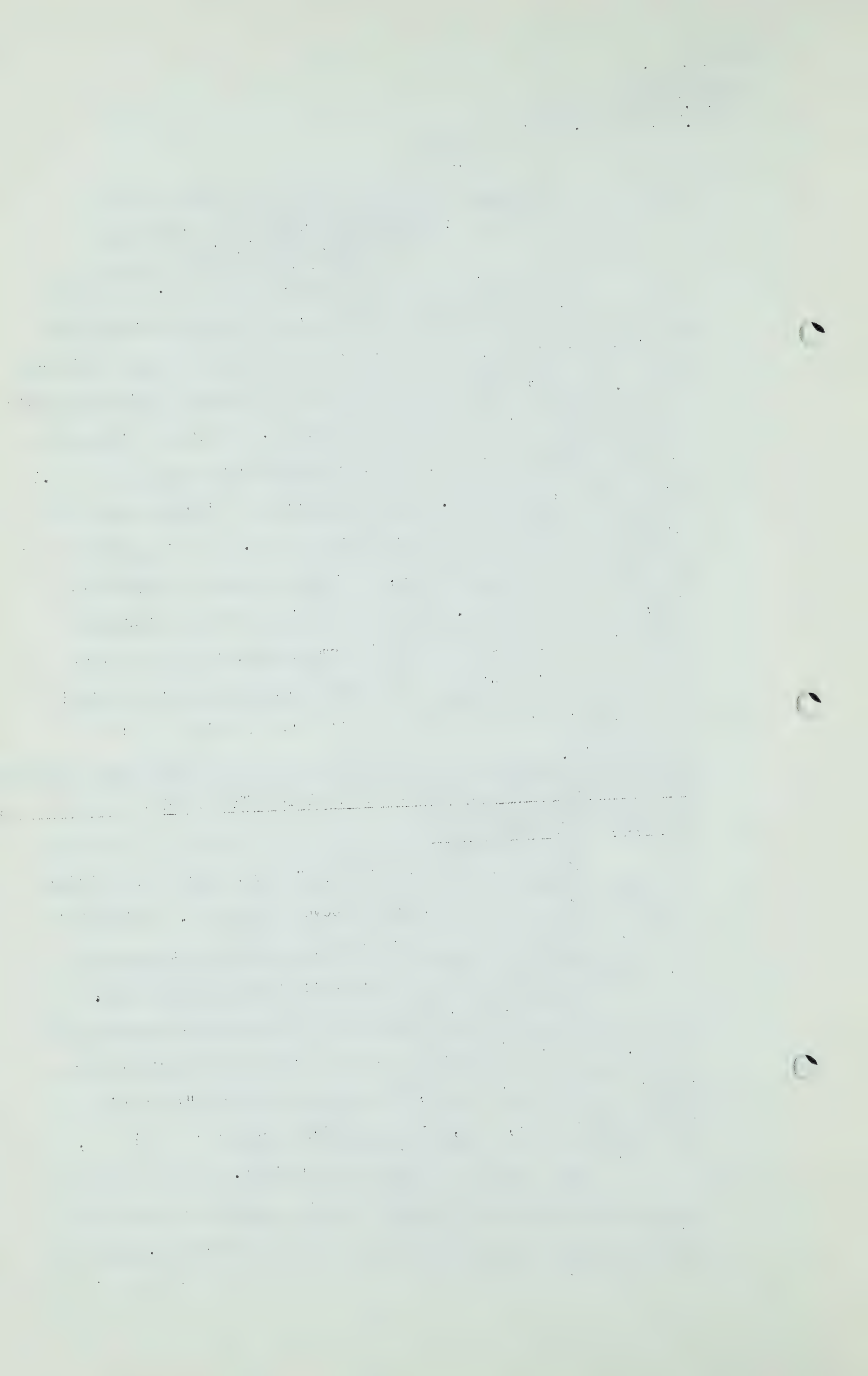
During the war efforts were made to divert sawdust to industrial use, causing a shortage in domestic requirements. The sale and use of fuel oil was under strict controls from September 1940 to September 1945. Between 1928 and 1940 the consumption of fuel oil for domestic use rose from 6.7 million gallons to 27.9 million gallons and controls abruptly stopped and reversed the trend. Retail coal sales in Vancouver rose from 123,000 tons in 1941 to a peak of 467,000 tons in 1943. These economic forces confuse the trend in heating fuels used in dwellings, but subsequent figures in this brief on the consumption of coal and fuel oil indicate the resumption of the rapid swing to the use of fuel oil.

RESOURCES AND CONSUMPTION OF FUEL AND POWER IN BRITISH COLUMBIA  
FUEL AND POWER RESOURCES

The confirmed fuel and power resources of British Columbia consist of coal, water power and wood. Potential resources which are not sufficiently proven to be included for consideration consist of natural gas and petroleum.

Possessing eight per cent of the population of Canada, British Columbia has 27 per cent of the water power resources of the Dominion, 19 per cent of the "probable recoverable" coal, and, at a somewhat arbitrary estimate, 10 per cent of the wood available for fuel.

The relative importance of the fuel and power resources in British Columbia is not easily stated. In energy terms, the measured water power of the Province is



R.S.Davidson,  
Dir.Ex.by Mr. Nolan

- 230 -

equivalent to 46 million tons of coal. The accessible timber available for fuel is the equivalent of 36 million tons of coal, and the probable recoverable coal reserves amount to 5.9 billion tons. The water power figure is an annual potential while the coal figure states a total fixed asset. The timber estimate is stated as a fixed asset but is subject to reforestation.

The resources of coal and water power indicate that British Columbia has hardly begun to use its two major sources of energy. This point is further underscored by analysis of the character of fuel and power consumption in the Province.

#### FUEL & POWER CONSUMPTION

The total annual consumption in equivalent tons of coal and the percentage supplied by each energy source is shown in the following table:

Year	Total Energy Consumption in Equivalent Tons of Coal	Percentage of Consumption Supplied by:			
		Coal	Petroleum	Electricity	Wood and Sawdust
1928	5,300,000	48%	25%	13%	14%
1930	5,000,000	40	28	16	16
1932	4,300,000	37	30	18	15
1934	4,200,000	33	29	22	16
1936	4,700,000	31	31	23	15
1938	4,900,000	30	30	26	14
1940	5,500,000	32	30	25	13
1942	6,400,000	34	29	26	11
1944	6,300,000	34	28	27	11
1946	6,700,000	30	32	28	10
1948	7,800,000	24	38	28	10

The point of outstanding significance appearing in the table is the very considerable dependence of the Province on an imported energy source, petroleum. This dependence has increased steadily from 1928, when petroleum supplied 25 per cent of the total, to 1948, when it supplied





R.S.Davison,  
Dir.Ex. by Mr. Nolan

- 231 -

38 percent of the total. The war years interrupted but did not disturb the basic trend.

FACTORS AFFECTING THE MARKET FOR NATURAL GAS

COAL COMPETITION

The Metropolitan Vancouver coal market is supplied with coal from Vancouver Island, the "Inland Area", the Crow's Nest area and Alberta. The Vancouver Island mines, a short distance from Vancouver by water, can supply only one-third of the Provincial requirement. The mines of the "Inland Area" are 170 miles distant by rail from Vancouver and the output is almost negligible. The Vancouver area, the greatest market area, is therefore dependent for the major portion of its coal supplies on the mines of the Crow's Nest and Alberta, 700 miles distant by rail. This coal carries the high transportation cost which makes it an expensive fuel. The competitive position of coal is stated in the report of the Royal Commission on Coal 1946, as follows:

"The importance of coal as a source of energy is less in British Columbia than in any of the other areas into which Canada has been divided for the purposes of the discussion of the coal markets..... .

"This information indicates quite clearly that coal in British Columbia is under very strong pressure from almost all the alternative sources of energy and explains why the market for coal is so limited.....

"An effort was made during the years of World War II to ease the oil situation by the diversion of wood fuel in the form of hogged fuel to industrial consumers. The use by industry of wood fuel in the postwar period may be expected to decline somewhat, but the market opened is more likely



R.S. Davidson,  
Dir. Ex. by Mr. Nolan

- 232 -

to be filled by oil than by coal."

#### TREND OF COAL CONSUMPTION IN BRITISH COLUMBIA

Shown in the following table is the total consumption of coal for all purposes in British Columbia:

<u>Year</u>	<u>Coal Consumption in Tons</u>	<u>PerCapita Consumption Coal Tons</u>
1928	2,511,073	3.92
1930	1,987,320	2.94
1932	1,591,978	2.26
1934	1,409,120	1.94
1936	1,473,626	1.97
1938	1,471,481	1.90
1940	1,755,457	2.18
1942	2,217,681	2.54
1944	2,156,237	2.31
1946	1,976,496	1.97
1948	1,875,432	1.73

The significant factor in the above is that coal consumption per capita in 1948 is only 44% of the 1928 figure.

#### WOOD COMPETITION

Wood and the waste from the sawmills in the form of sawdust, hogged fuel slabs and edgings at one time provided the major source of fuel in the Vancouver area. The supply of this material is diminishing due to withdrawal of mills from the market area. The added handling and transportation cost to supply the market has greatly reduced the competitive position it once held. Industries which relied on this cheap fuel have now switched or are preparing to change to other fuel. While wood waste still maintains a competitive price advantage over other fuels, its importance as a major source of energy is rapidly diminishing.





R.S.Davidson  
Dir.Ex.by Mr. Nolan

- 233 -

#### WOOD FUEL CONSUMPTION

The following figures are the retail fuel sales of the Greater Vancouver Retail Fuel Dealers Association, showing the sales of sawdust and wood in that area:

<u>Year</u>	<u>Monthly Average Sale</u>	
	<u>Units of Sawdust</u>	<u>Cords of Wood</u>
1943	24,430	17,750
1944	22,375	15,770
1945	21,507	15,515
1946	19,020	15,508
1947	16,174	15,147
1948	18,339	15,713

In spite of having a competitive price advantage the quantity of wood products used for fuel sags in an expanding fuel market.

#### FUEL OIL COMPETITION

The dependence of the Province on fuel oil as an energy source indicates that it would be the chief competition for natural gas. While the tight oil supply situation has now eased, the prospect of shortages in the future remains as a distinct possibility. One of the major considerations in competition between fuels is the question of reliability of supply.

#### TREND OF FUEL OIL CONSUMPTION IN BRITISH COLUMBIA

The following table shows the rapidly expanding sale of Fuel Oil in British Columbia for industrial, domestic and building heating purposes before the war and since the release from controls:



R.S.Davidson,  
Dir.Ex. by Mr.Nolan

- 234 -

Year	Fuel Oil For Domestic & Building Heating Purposes		
	Fuel Oil Used For Industrial Purposes-B.C.	British Columbia	Vancouver & New Westminster
	In Thousands of Imperial Gallons		
1928	39,693	6,684	6,029
1930	42,947	13,183	8,215
1932	18,588	13,554	11,119
1934	30,423	16,555	11,958
1936	37,119	23,003	16,955
1938	33,389	27,256	19,302
1940	49,263	27,910	19,243
1942	65,726	24,923	17,190
1944	66,554	16,789	10,207
1946	49,665	52,620	40,211
1948	102,625	84,134	63,053

#### CONSUMPTION OF FUEL OIL IN CANADA AND B.C.

The figures in the table below show the quantity of fuel oil used per capita by classes of consumer in Canada and British Columbia.

#### Consumption of Petroleum Fuels in Canada and British Columbia 1948

Use	B.C. and Yukon		Canada	
	Imp.Gals.	Per Capita	Imp.Gals.	Per Capita
Heating and cooking	84,133,963	77.2	594,363,716	46.1
Consumption under refinery boilers	13,407,030	12.3	175,368,847	13.6
Electric light plants	6,398,317	5.9	29,137,624	2.3
Industrial purposes as fuel and material	102,624,724	94.1	448,633,575	34.8
Tractor and other motor vehicles as fuel	6,429,010	5.9	84,093,472	6.5
Railways	28,204,737	25.9	118,000,862	9.2
Bunkering, including suppliers tankers	66,747,822	61.2	267,719,736	20.8
Unspecified	7,408,641	6.8	37,845,149	2.9
Total	315,354,244	289.3	1,755,162,981	136.2

Source: D.B.S. Consumption of Petroleum  
Fuels in Canada 1948, Ottawa  
1949 (D.B.S. Working Papers)





R.S. Davidson,  
Dir. Ex. by Mr. Nolan

- 235 -

It will be noted the total per capita consumption in B.C. is more than double that of the Canadian average. Used for heating and cooking purposes per capita consumption is 77.2 gallons compared with 46.1 gallons for Canada and used for industrial purposes the consumption per capita is nearly 3 times the national average.

#### FUEL CONSUMPTION OF METROPOLITAN VANCOUVER

The table on page 14 is an estimate of fuel consumption - coal, fuel oil and wood products - in the Metropolitan Vancouver area for domestic, commercial, and industrial purposes where it would be possible to use natural gas as an alternate fuel. Thus coal used for ship bunkering and railway purposes, and fuel oils and distillates used for similar purposes are not included in the estimates.

The source of the figures and basis of the estimate are as follows. Coal dealers are licensed by and subject to the Coal and Petroleum Control Board and the reports of the Board furnish data on retail and wholesale coal sales by districts. There are no available statistics on consumer purchases direct from the mine, such as the 62,000 tons purchased in 1948 by the British Columbia Electric Company. It is estimated that a minimum of 125,000 tons is purchased in this manner, which is included in the estimate. Fuel oil consumption figures for Vancouver and New Westminster area for domestic and building heating purposes are obtained from Dominion Bureau of Statistics report on "Consumption of Fuel Oils in Canada." Figures for fuel oils used for industrial purposes in B.C., obtained from the same source, give only the provincial total, and 50 per cent of this amount is estimated to be used in the Metropolitan Vancouver



R.S.Davidson-  
Dir.Ex by Mr.Nolan

- 236 -

area, on the basis that the area embraces more than half the population and manufacturing industry of the Province. Cord wood, sawdust and hog fuel consumption figures are obtained from the Greater Vancouver Retail Fuel Dealers Association.

Natural Gas Equivalent of the 1948 Consumption  
of Coal, Fuel Oil, and Wood Products  
for Domestic, Commercial, and Industrial Uses  
in Metropolitan Vancouver

---

	<u>Tons</u>	<u>Equivalent MCF Natural Gas @ 1,000 BTU per CF</u>
<u>Coal</u>		
<u>Coal Sold at Retail</u>		
City of Vancouver	353,038	
City of North Vancouver	18,429	
City of New Westminster	59,801	
	<u>431,268</u>	11,212,968
<u>Coal Sold at Wholesale</u>		
City of Vancouver	168,089	
City of North Vancouver	30,587	
City of New Westminster	36,707	
	<u>235,383</u>	6,119,958
Estimate of Coal Purchased Direct from the Mines (Including B.C. Electric Co.)	125,000	<u>3,250,000</u>
		<u>20,582,926</u>
<u>Fuel Oil</u>		
<u>Fuel Oil for Heating</u>	<u>Imp. Gallons</u>	
Vancouver & New Westminster	63,052,574	11,177,330
<u>Fuel Oil for Manufacturing Purposes</u>	51,312,362	<u>9,096,142</u>
(50% of Provincial Consumption)		<u>20,273,472</u>
<u>Wood Products</u>		
Cord Wood	188,558 cords	3,197,189
Sawdust	220,075 units	4,163,819
Hog Fuel	140,218 units	<u>2,641,707</u>
		<u>10,002,715</u>
<u>Coal, Fuel Oil and Wood - Total Equivalent CF Natural Gas</u>		<u>50,859,113</u>





R.S.Davidson,  
Dir.Ex.by Mr. Nolan

- 237 -

Ref: Coal and Petroleum Control Board, 11th Annual Report,  
p. E14. Victoria 1949.

Greater Vancouver Retail Fuel Dealers' Assn. Report.

D.B.S., Preliminary Report on Coal and Coek Statistics  
for Canada 1948, p.9. Ottawa 1949.

D.B.S., Consumption of Petroleum Fuels in Canada 1948  
(Work Sheets D.B.S.)

Conversion factors used are shown on Table 8.

The quantities of fuel shown on the table have been converted on a B.T.U. basis to an equivalent of natural gas of 1,000 B.T.U. per cubic foot stated in MCF. terms. The total estimated fuel used has a B.T.U. content equivalent to approximately 51 billion cubic feet of natural gas. This figure represents a potential consumption of fuel which could be met with the utilization of natural gas.

#### SUMMARY

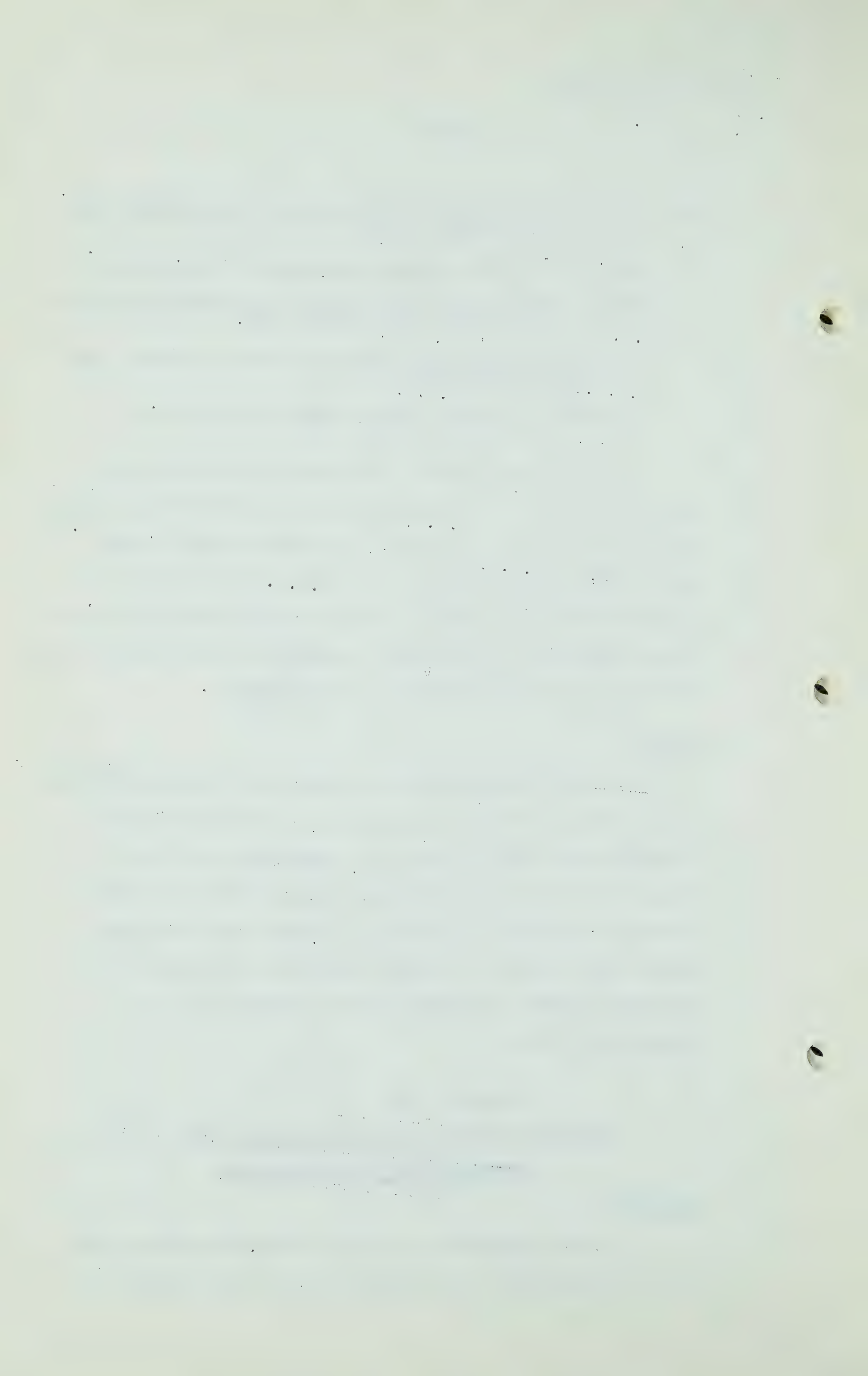
The foregoing data outlining the industrial nature of the British Columbia economy, the concentration of population and manufactures, the ownership and types of homes, the trend of domestic heating facilities and the trends in consumption of fuels, indicate that the coast market area should be readily adaptable and should be receptive to the introduction of natural gas at a competitive price.

#### P A R T    I I

#### ESTIMATED MARKET FOR NATURAL GAS IN THE METROPOLITAN VANCOUVER AREA

#### PURPOSE

The quantities of coal, petroleum and wood used in the Metropolitan Vancouver area have been examined in



R.S.Davidson,  
Dir.Ex. by Mr. Nolan

- 238 -

the first part of this brief. The purpose of this section is to estimate the fuel requirements which would be met by the utilization of natural gas.

#### BASIC ASSUMPTIONS

In estimating the future market for natural gas it has been assumed that -

1. Population growth of British Columbia and the Metropolitan Vancouver area will exceed the national average and the construction of necessary housing accommodation will continue.
2. The index of business activity and industrial expansion will continue at a moderately high level.
3. Natural gas will be made available at a competitive price and the rates finally established will be no major barrier to its widespread use.
4. With the introduction of natural gas the present pattern of the sale of gas will change from principally Domestic and Commercial use for cooking and water heating to preponderantly Domestic space heating and Industrial use, conforming more or less to the pattern which prevails in areas where natural gas has been made available through transmission.

#### BRITISH COLUMBIA ELECTRIC COMPANY, LIMITED

##### Incorporation

The British Columbia Electric Company, Limited was incorporated on March 4th, 1926, as British Columbia Electric Power & Gas Company, Limited and its name was changed to its present name on December 17th, 1946.





R.S. Davidson  
Dir.Ex. by Mr. Nolan

- 239 -

### Operation

The Company owns two gas manufacturing plants in Vancouver, including coal gas and carburetted water gas generating units, coal, coke and ash handling equipment and tar treatment plants, and three gas storage and distribution stations. The Company distributes gas in the Greater Vancouver area, namely:

City of Vancouver  
City of North Vancouver  
City of New Westminster  
Municipality of Burnaby  
Municipality of North Vancouver  
University Endowment Lands

### Manufacturing Plants

The manufacturing facilities of 460 btu gas and capacity are as follows -

<u>Type</u>	<u>Number</u>	<u>Daily Capacity</u>
Chamber oven plant	39 ovens	4,000 MCF
Humphrey's Glasgow C.W.G. plant	2 C.W.G. units	4,000 MCF
Power Gas C.W.G. plant	2 C.W.G. units	<u>9,000 MCF</u>
		17,000 MCF

The capacity of the two older plants which are now shut down are as follows:-

<u>Type</u>	<u>Number</u>	<u>Daily Capacity</u>
Glover West Retort Plant	36 retorts	800 MCF
Economical C.W.G. plant		<u>750 MCF</u>
		1550 MCF

### Gas Storage Holders and Distribution

The Company owns 5 storage holders located in Vancouver, North Vancouver and New Westminster with a total capacity of 5,900,000 cubic feet. At the end of 1949, the distribution system consisted of a little more than 660



R.S.Davison  
Dir. Ex. by Mr.Nolan

- 240 -

miles of mains ranging in size from 3/4" to 30" in size.  
About half of the total is in the 4" size.

#### Annual Production

The annual production of manufactured gas of 460 BTU per cubic foot for 1947, 1948 and 1949 and estimated production for 1950 are as follows:-

<u>Year</u>	<u>Coal Gas-MCF</u>	<u>Annual Production C.W.Gas-MCF</u>	<u>Total-MCF</u>
1947 - actual	1,533,155	1,192,755	2,725,910
1948 - actual	863,634	2,053,529	2,917,163
1949 - actual	1,150,000	1,999,000	3,149,000
1950 - estimated	1,592,000	1,730,000	3,322,000

#### Fuel Requirement and Supply

Oil and coal purchased by the Company and their origins for the period 1941 to 1949 and the estimated purchases during 1950 are as follows:

<u>Year ended Dec.31</u>	<u>Oil Imp.Gals</u>	<u>Coal</u>		<u>Alberta S.Tons</u>	<u>Total S.Tons</u>
		<u>Island S.Tons</u>	<u>Mainland S.Tons</u>		
1941	258,957	81,077	141	-	81,218
1942	656,632	89,739	11,084	-	100,823
1943	1,206,035	65,605	48,570	1,540	115,715
1944	821,925	75,734	30,223	7,135	113,092
1945	1,484,675	38,113	26,296	52,656	117,265
1946	1,590,206	38,597	23,013	70,220	131,830
1947	2,488,763	38 883	24,122	51 725	114 730
1948	4,176,920	31,540	10,346	20,800	62,686
1949	3,817,000	80,000	1,982	10,594	72,538
1950 (Estimated)	3,671,800	100,000	-	-	100,000

Temperature (°C)	Rate
10	0
20	20
30	60
40	100
50	80
60	70
70	60

Age Group	No	Yes	Don't know	No answer	Other
18-24	~45%	~35%	~10%	~5%	~1%
25-34	~40%	~40%	~10%	~5%	~1%
35-44	~35%	~45%	~10%	~5%	~1%
45-54	~30%	~50%	~10%	~5%	~1%
55-64	~25%	~55%	~10%	~5%	~1%
65+	~20%	~60%	~10%	~5%	~1%

1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 26

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100. 101. 102. 103. 104. 105. 106. 107. 108. 109. 110. 111. 112. 113. 114. 115. 116. 117. 118. 119. 120. 121. 122. 123. 124. 125. 126. 127. 128. 129. 130. 131. 132. 133. 134. 135. 136. 137. 138. 139. 140. 141. 142. 143. 144. 145. 146. 147. 148. 149. 150. 151. 152. 153. 154. 155. 156. 157. 158. 159. 160. 161. 162. 163. 164. 165. 166. 167. 168. 169. 170. 171. 172. 173. 174. 175. 176. 177. 178. 179. 180. 181. 182. 183. 184. 185. 186. 187. 188. 189. 190. 191. 192. 193. 194. 195. 196. 197. 198. 199. 200. 201. 202. 203. 204. 205. 206. 207. 208. 209. 210. 211. 212. 213. 214. 215. 216. 217. 218. 219. 220. 221. 222. 223. 224. 225. 226. 227. 228. 229. 230. 231. 232. 233. 234. 235. 236. 237. 238. 239. 240. 241. 242. 243. 244. 245. 246. 247. 248. 249. 250. 251. 252. 253. 254. 255. 256. 257. 258. 259. 260. 261. 262. 263. 264. 265. 266. 267. 268. 269. 270. 271. 272. 273. 274. 275. 276. 277. 278. 279. 280. 281. 282. 283. 284. 285. 286. 287. 288. 289. 290. 291. 292. 293. 294. 295. 296. 297. 298. 299. 300. 301. 302. 303. 304. 305. 306. 307. 308. 309. 310. 311. 312. 313. 314. 315. 316. 317. 318. 319. 320. 321. 322. 323. 324. 325. 326. 327. 328. 329. 330. 331. 332. 333. 334. 335. 336. 337. 338. 339. 340. 341. 342. 343. 344. 345. 346. 347. 348. 349. 350. 351. 352. 353. 354. 355. 356. 357. 358. 359. 360. 361. 362. 363. 364. 365. 366. 367. 368. 369. 370. 371. 372. 373. 374. 375. 376. 377. 378. 379. 380. 381. 382. 383. 384. 385. 386. 387. 388. 389. 390. 391. 392. 393. 394. 395. 396. 397. 398. 399. 400. 401. 402. 403. 404. 405. 406. 407. 408. 409. 410. 411. 412. 413. 414. 415. 416. 417. 418. 419. 420. 421. 422. 423. 424. 425. 426. 427. 428. 429. 430. 431. 432. 433. 434. 435. 436. 437. 438. 439. 440. 441. 442. 443. 444. 445. 446. 447. 448. 449. 450. 451. 452. 453. 454. 455. 456. 457. 458. 459. 460. 461. 462. 463. 464. 465. 466. 467. 468. 469. 470. 471. 472. 473. 474. 475. 476. 477. 478. 479. 480. 481. 482. 483. 484. 485. 486. 487. 488. 489. 490. 491. 492. 493. 494. 495. 496. 497. 498. 499. 500. 501. 502. 503. 504. 505. 506. 507. 508. 509. 510. 511. 512. 513. 514. 515. 516. 517. 518. 519. 520. 521. 522. 523. 524. 525. 526. 527. 528. 529. 530. 531. 532. 533. 534. 535. 536. 537. 538. 539. 540. 541. 542. 543. 544. 545. 546. 547. 548. 549. 550. 551. 552. 553. 554. 555. 556. 557. 558. 559. 560. 561. 562. 563. 564. 565. 566. 567. 568. 569. 570. 571. 572. 573. 574. 575. 576. 577. 578. 579. 580. 581. 582. 583. 584. 585. 586. 587. 588. 589. 590. 591. 592. 593. 594. 595. 596. 597. 598. 599. 600. 601. 602. 603. 604. 605. 606. 607. 608. 609. 610. 611. 612. 613. 614. 615. 616. 617. 618. 619. 620. 621. 622. 623. 624. 625. 626. 627. 628. 629. 630. 631. 632. 633. 634. 635. 636. 637. 638. 639. 640. 641. 642. 643. 644. 645. 646. 647. 648. 649. 650. 651. 652. 653. 654. 655. 656. 657. 658. 659. 660. 661. 662. 663. 664. 665. 666. 667. 668. 669. 670. 671. 672. 673. 674. 675. 676. 677. 678. 679. 680. 681. 682. 683. 684. 685. 686. 687. 688. 689. 690. 691. 692. 693. 694. 695. 696. 697. 698. 699. 700. 701. 702. 703. 704. 705. 706. 707. 708. 709. 710. 711. 712. 713. 714. 715. 716. 717. 718. 719. 720. 721. 722. 723. 724. 725. 726. 727. 728. 729. 730. 731. 732. 733. 734. 735. 736. 737. 738. 739. 740. 741. 742. 743. 744. 745. 746. 747. 748. 749. 750. 751. 752. 753. 754. 755. 756. 757. 758. 759. 760. 761. 762. 763. 764. 765. 766. 767. 768. 769. 770. 771. 772. 773. 774. 775. 776. 777. 778. 779. 780. 781. 782. 783. 784. 785. 786. 787. 788. 789. 790. 791. 792. 793. 794. 795. 796. 797. 798. 799. 800. 801. 802. 803. 804. 805. 806. 807. 808. 809. 810. 811. 812. 813. 814. 815. 816. 817. 818. 819. 820. 821. 822. 823. 824. 825. 826. 827. 828. 829. 830. 831. 832. 833. 834. 835. 836. 837. 838. 839. 840. 84

10

•

• •

1. 2. 3.

100

1. 2.

1631



R.S.Davidson,  
Dir.Ex. by Mr. Nolan

- 241 -

Coal supplies from B.C. Mines prior to 1943 were adequate to meet requirements of the Company. Subsequently the supply situation in B.C. deteriorated. The increased demand for gas fuel made increasing purchases of coal from Alberta necessary. Labour trouble after the war continued to aggravate the short supply position.

Changes made in the manufacturing process during 1947 to increase production of carburetted water gas have resulted in a reduction in coal requirements and a consequent increase in oil consumption. Increasing tonnage of H.C. coal was available during 1949 and it is anticipated that purchases of coal from sources other than Vancouver Island will be eliminated in 1950.

#### FORECAST OF THE UTILIZATION OF NATURAL GAS

Predicated upon natural gas of 1000 BTU per cubic foot being available in the Greater Vancouver area during 1951, market estimates have been prepared through to the end of 1956. It is assumed that 1952 is the 1st full year of natural gas distribution.

The estimates are based on the number of customers presently served by the Company and the progressive increase in number of customers and their annual gas consumption experienced over the past several years and which will be stimulated by the advent of a cheaper fuel.

The rates now in effect for manufactured gas are given on Table 1.

#### Estimate of Domestic Use

There are 49,220 domestic customers presently being served by the British Columbia Electric Company. General domestic use (all service except space heating) customers amount to 48,404 or 98 per cent of the total. Two per cent or 816 domestic



R.S.Davidson,  
Dir.Ex. by Mr. Nolan

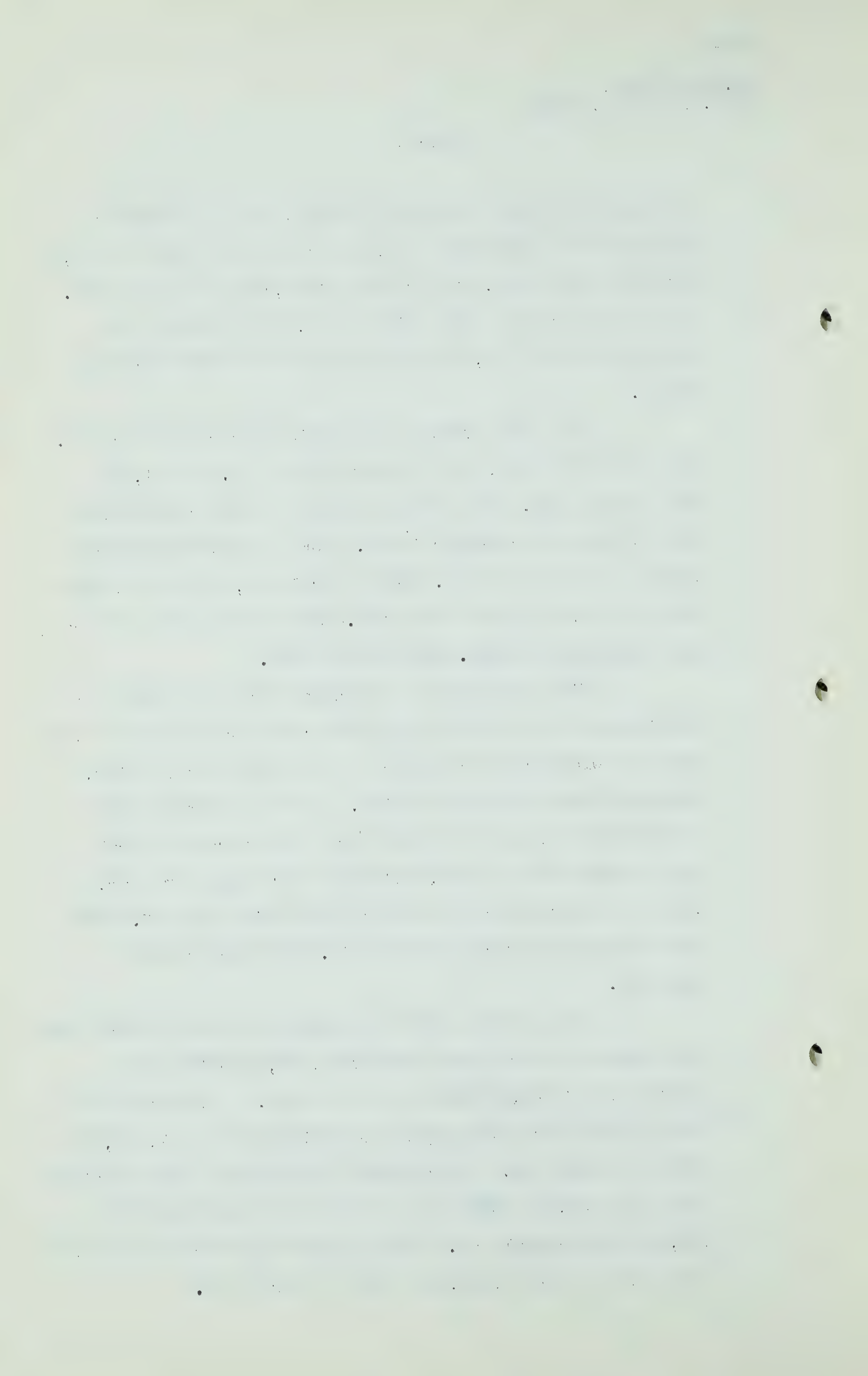
- 242 -

customers use gas for space heating. It is estimated that by the 5th full year of natural gas there will be 76,400 domestic customers, an increase of 27,180 or 55 per cent. The classification then will be 61,400 on general use rates of 80% and 15,000 or 20 per cent on space heating rates.

The 1949 average consumption per customer is 32.4 MCF of 460 BTU gas, or an equivalent of 14.9 MCF 1,000 BTU natural gas. The present annual average consumption per general use customer is 28.1 MCF of manufactured gas or the equivalent of 12.9 MCF natural gas, and the average space heating customer uses 288.0 MCF manufactured gas or the equivalent of 132.4 MCF natural gas.

With the advent of cheaper fuel there will be an acceleration in the use of gas per customer consequent upon the more widespread acceptance of gas for water heating, refrigeration and space heating. It is estimated that by the 5th full year of natural gas the average general use customer will use 22.9 MCF of natural gas per year, and the average space heating customer will use 137.3 MCF and the overall average will be 45.4 MCF per customer per year.

The present annual consumption of manufactured gas for domestic general use amounts to 1,360,000 MCF or an equivalent of 625,600 MCF of natural gas. Consumption in the 5th year for this purpose is estimated to be 1,408,000 MCF of natural gas. The present customers on space heating rates use 235,000 MCF manufactured or an equivalent of 108,100 MCF natural gas. Space heating customers in the 5th year will require 2,060,000 MCF of natural gas.





R.S. Davidson,  
Dir. Ex. by Mr. Nolan

- 243 -

The following table shows the present consumption distribution and that anticipated in the 5th full year of natural gas.

|                            | 1949<br>Consump-<br>tion<br>Mfd.<br>Gas<br>MCF | Equiv.<br>Natural<br>Gas | %<br>Dist. | 5th<br>Year<br>Natural<br>Gas<br>Consump-<br>tion<br>MCF | %<br>Dist. |
|----------------------------|--|--------------------------|------------|--|------------|
| Gen. Use<br>Customers      | 1,360,000                                      | 625,600                  | 85%        | 1,408,000  | 40%        |
| Space Heating<br>Customers | <u>235,000</u>                                 | <u>108,100</u>           | <u>15%</u> | <u>2,060,000</u>   | <u>60%</u> |
| Total                      | 1,595,000                                      | 733,700                  | 100.0%     | 3,468,000  | 100.0%     |

Details of present distribution and future estimates of the number of domestic customers, average consumption and their annual requirements are given on Table No. 2.

#### Estimate of Commercial Use

It is anticipated that the introduction of natural gas will have a less striking effect on commercial use than on domestic use. The company now enjoys a moderate amount of commercial space heating business in spite of prices that are much higher than fuel oils. This business has been obtained because of the collateral advantages of gas, such as cleanliness, lower installation cost, and saving of building space. The present customers and average consumption and the estimates for the 5th full year of natural gas are as follows:-



R.S.Davidson,  
Dir.Ex.by Mr. Nolan

- 244-

|                            | 1949<br>Custo-<br>Mers | Average<br>Consump-<br>-tion<br>Mcf.<br>Gas<br>MCF | Equiv.MCF<br>Natural<br>Gas MCF | Custo-<br>mers<br>5th<br>Year | Natural<br>Gas<br>Consump-<br>-tion MCF |
|----------------------------|------------------------|--|---------------------------------|-------------------------------|---|
| General Use<br>Customers   | 5,121                  | 160.1  | 73.7                            | 6,334                         | 99.5                                    |
| Space Heating<br>Customers | <u>409</u>             | 388.8  | 178.8                           | <u>666</u>                    | 382.9                                   |
| Totals and<br>averages     | 5,530                  | 177.0  | 81.4                            | 7,000                         | 126.4                                   |

By comparison the total annual sales will be as follows:

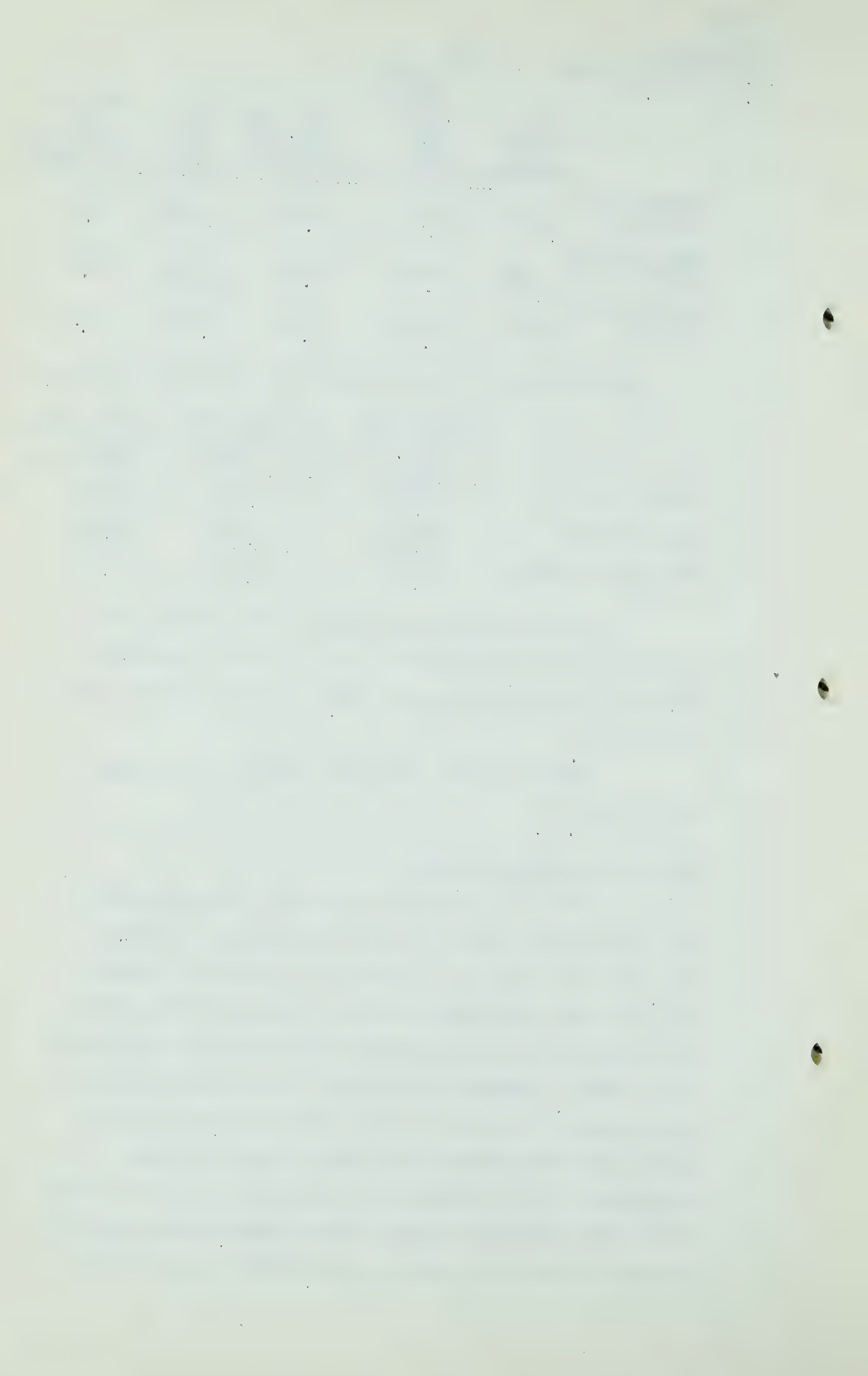
|                    | Consumption<br>1949 Mcf.Gas<br>MCF | Natural Gas<br>Equivalent<br>MCF | 5th Year<br>Natural Gas<br>MCF |
|--------------------|------------------------------------|----------------------------------|--------------------------------|
| General use        | 820,000                            | 377,200                          | 630,000                        |
| Space Heating      | <u>159,000</u>                     | <u>73,140</u>                    | <u>255,000</u>                 |
| Total Annual Sales | 979,000                            | 450,340                          | 885,000                        |

It is estimated the present consumption of the equivalent of 450,340 MCF of natural gas for commercial use will be almost doubled to 885,000 MCF by the 5th year of natural gas.

Details of the commercial estimates are given on Table No. 3.

Estimate of Industrial Use

The sale of gas for industrial purposes would be most profoundly affected by the introduction of natural gas. The use of gas in industry is limited at present to a few high grade applications of metal melting, heat treating, enamelling and similar operations on a relatively small scale. Competitive pricing would greatly extend the use of gas in the manufacturing industries, particularly in the many cases where gas could be used for steam generation. It is expected that the annual use of firm gas alone would increase from the present 363,000 MCF manufactured gas or the equivalent of 166,980 MCF natural gas to





R.S.Davidson,  
Dir.Ex by Mr. Nolan

- 245 -

1,306,000 MCF natural gas in the 5th full year.

The industrial use of gas on an interruptible basis would be used mostly for steam generation in equipment designed to burn oil as an alternative fuel. Customers served on this basis would be required to change over to the alternative fuel to limit maximum day requirements during the heating season. It is estimated that the annual consumption of interruptible gas will be 1,692,000 MCF after 5 years.

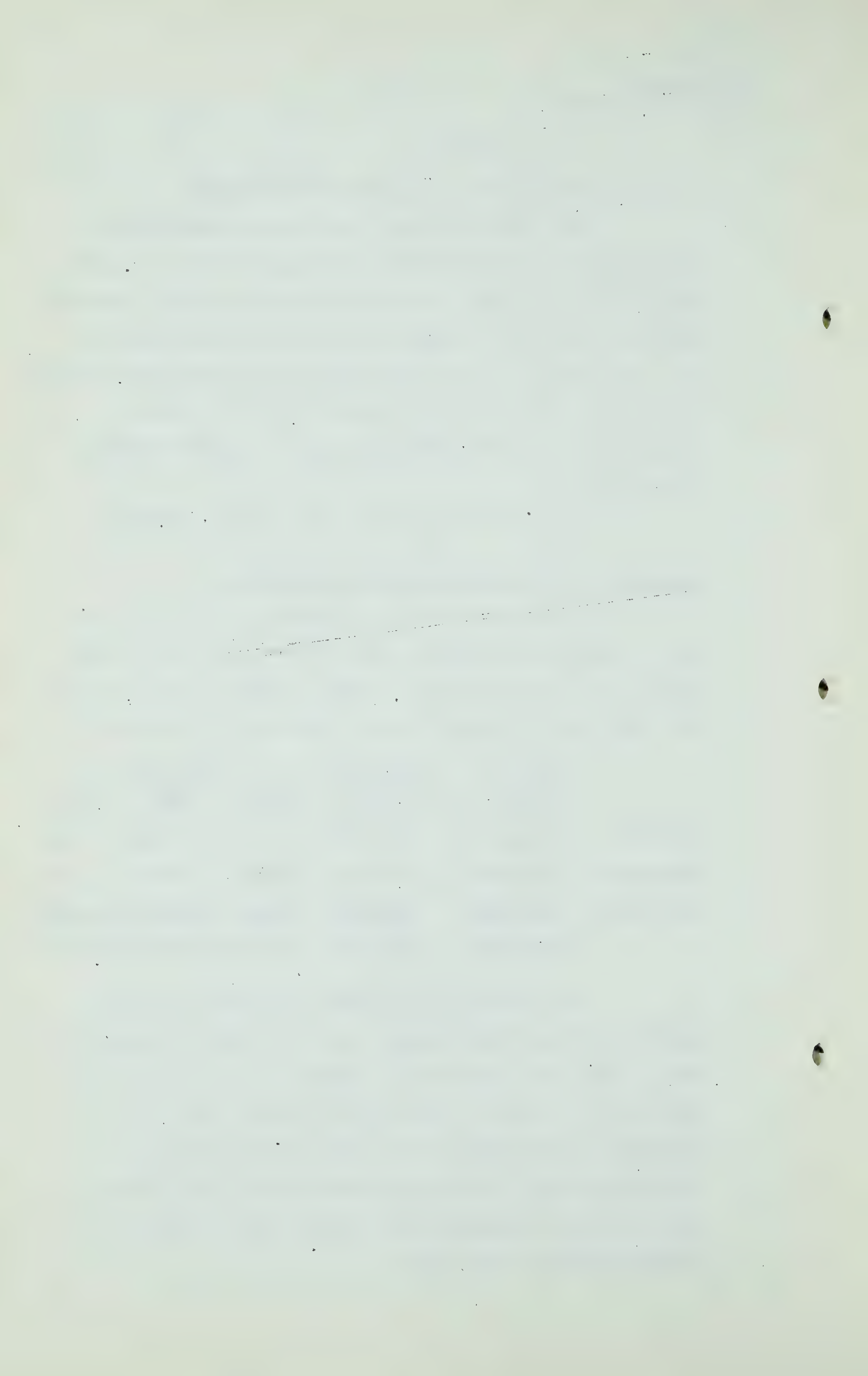
Details of the estimate are shown on Table 4.

#### Estimate of Total Annual Sales and Sendout

The estimates shown in detail on Tables 2, 3 and 4 are summarized on Table 5. The distribution of MCF sales by consumer classification at present and in the estimated 5th full year of natural gas are shown in the following:

|            | 1949 Mfd.<br>Gas<br>MCF | Equivalent<br>Nat.Gas<br>MCF | %<br>Dist.   | 5th Year<br>Nat.Gas<br>MCF | %<br>Dist.   |
|------------|-------------------------|------------------------------|--------------|----------------------------|--------------|
| Domestic   | 1,595,000               | 733,700                      | 54.3%        | 3,468,000                  | 47.2%        |
| Commercial | 979,000                 | 450,340                      | 33.3%        | 885,000                    | 12.0%        |
| Industrial | <u>363,000</u>          | <u>166,980</u>               | <u>12.4%</u> | <u>2,998,000</u>           | <u>40.8%</u> |
|            | 2,937,000               | 1,351,020                    | 100.0%       | 7,351,000                  | 100.0%       |

The present unaccounted for manufactured gas amounts to 212,000 MCF making the total sendout 3,149,000 MCF. The unaccounted for gas amounts to 6.7 per cent of the total. In the 1st full year of natural gas it is estimated 7.4 per cent of the total sendout will be unaccounted for, and this is reduced to 5.7 per cent in the 5th year, or 440,000 MCF, making a total sendout of 7,791,000 MCF for that year.



R.S.Davidson,  
Dir.Ex. by Mr.Nolan

- 246 -

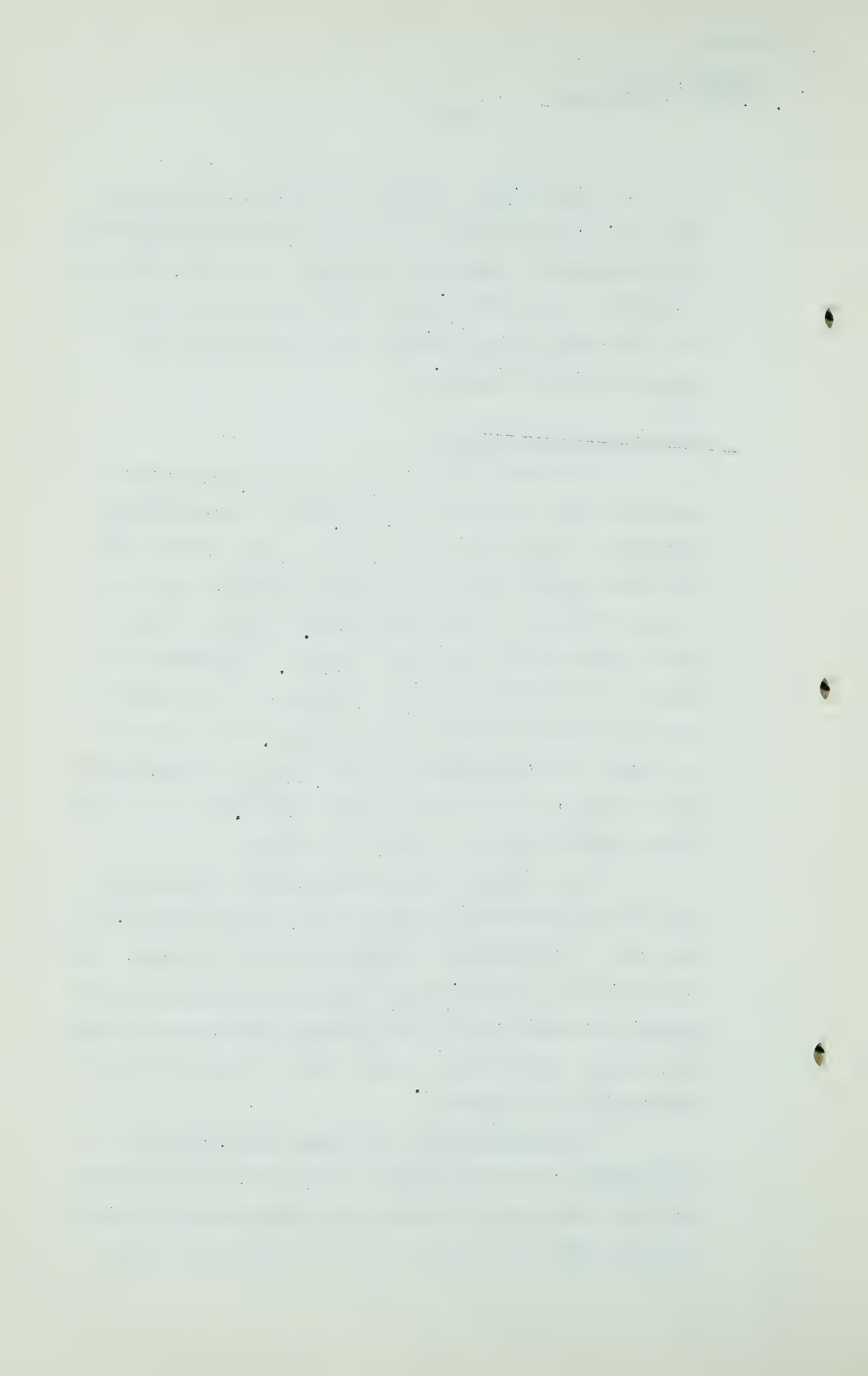
At present, domestic use accounts for 54% of the total sales, but this percentage will decrease before the more rapidly expanding industrial use, and is estimated to be 47% at the fifth year. For subsequent years, it is likely that the industrial uses would assume even greater relative importance.

#### Maximum Day Requirements

The maximum day requirement is possibly more important than any other single factor in designing and operating a gas transmission system. The maximum day has been computed from the separate estimates discussed above by assuming a load factor of 70% for non-heating uses of gas and 30% for space heating. A breakdown by classes of customers appears on Table 6. The maximum day sendout shows an increase from 12,280 MCF in the first dull year to 36,382 MCF in the 5th year. Residential space heating, by increasing from 3,445 MCF to 18,113 MCF, is the greatest single element of increase.

It is assumed that interruptible customers are cut off on peak days although this might not actually be the case if the pipeline capacity were not overtaxed. By curtailing the interruptible customers on peak days, the annual load factor will remain around 60% during the first five years; this figure assumes that no means of "peak shaving" will be adopted.

The maximum hour requirement is relatively unimportant. A city situated as Vancouver is could draw upon the "line pack" to supply very large peaks of short duration. This would not be true, of course, of a city





R.S.Davidson  
Dir.Ex. by Mr. Nolan

- 247 -

located close to a source of gas. The present experience of the Company is that the maximum hour demand is about 8% of the maximum day. This proportion might be altered somewhat as space heating assumed greater relative importance.

BASIS OF ESTIMATES

It is believed that the estimates of consumption have been made on a most conservative basis. They might easily have been higher without being unduly optimistic.

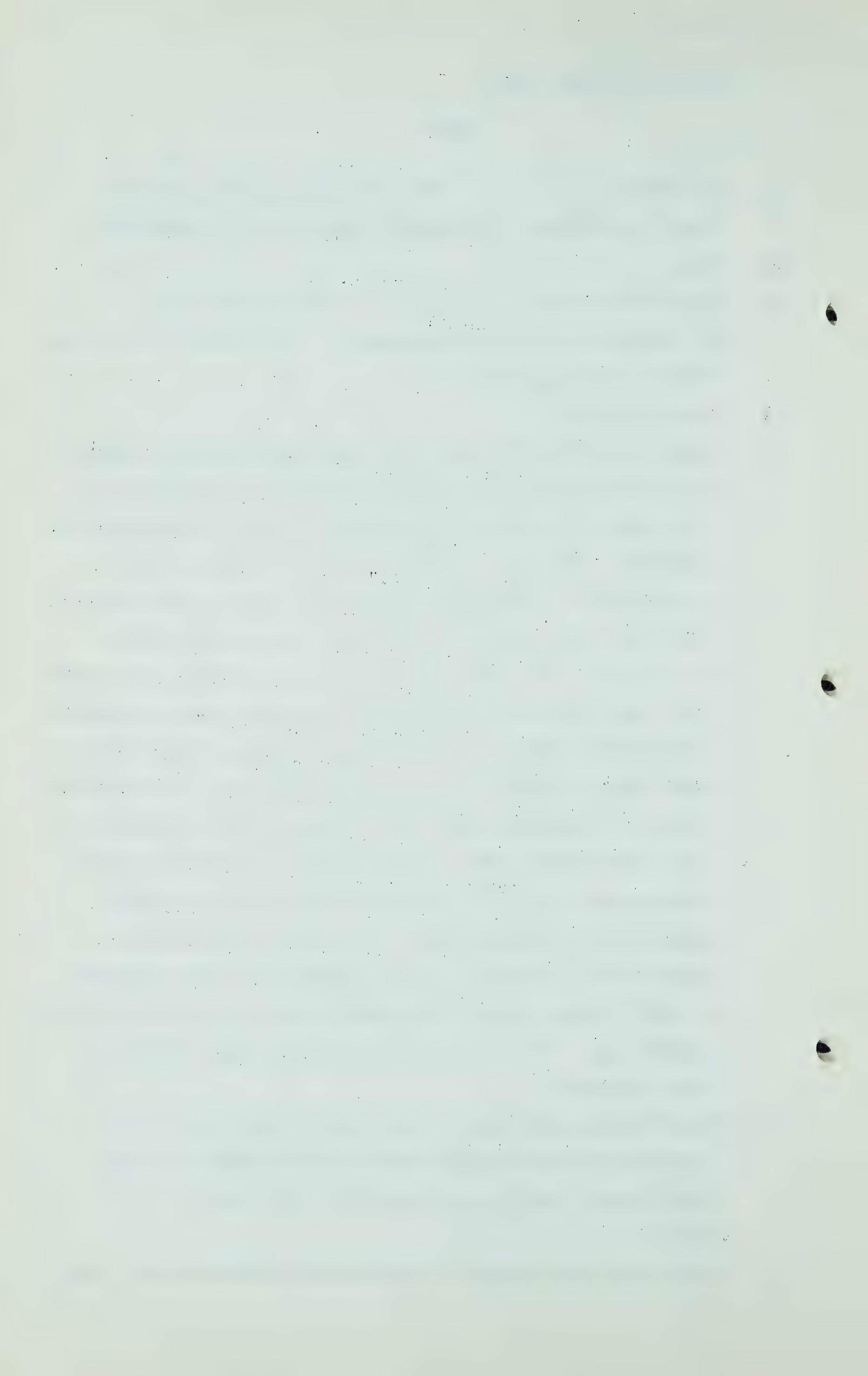
(Go to Page 248)



R. S. Davidson,  
Dir. Ex. by Mr. Nolan.

- 248 -

- Q MR. NOLAN: Mr. Davidson, you were present here a few minutes ago when Mr. Copp read his submission?
- A Yes.
- Q Would you please look at page 7 of that submission, Mr. Davidson, the second paragraph. It is under the heading, "Maximum Day Requirements"?
- A That is right.
- Q "Maximum day requirements of the gas distributing companies have been summarized and shown in Table C. To these have been added the peak day requirements of the direct industrial consumers. The load factor for the 5th year of natural gas operation is estimated to be 72 per cent, using Route B, and 65 per cent using Route A." Now these are the words, Mr. Davidson, "In both cases it would be possible to increase these load factors by utilizing on the peak days the present liquefied petroleum gas facilities of distributing companies which can be adapted to produce 1000 BTU gas." Is it possible for you to increase these load factors by the utilization of those facilities? What are your plans in respect to that?
- A Our estimates as we have presented them are on a purely distribution of natural gas. It would be possible to improve our load factor if our present plant was readjusted to 1000 BTU gas, but at the present time we are manufacturing 460 BTU gas. We have made no plans as to peak saving in these estimates.
- Q Now, Mr. Davidson, you in your exhibits which have been marked No. 6 have made an estimate of the amount of gas that you will sell at the end of the 5th year?
- A Yes.
- Q Where does that appear?. Just draw my attention to it, will





R. S. Davidson,  
Dir. Ex. by Mr. Nolan.

- 249 -

you, please, for the convenience of the Board and counsel?

A That is Table 5 of the brief, and it also appears on page 23 of the brief.

Q Yes?

A The summary table.

Q It is referred to on page 23 and is set out in more elaborate detail in Table No. 5?

A That is correct.

Q That is the controlling factor in this estimate which makes it possible for you to sell natural gas?

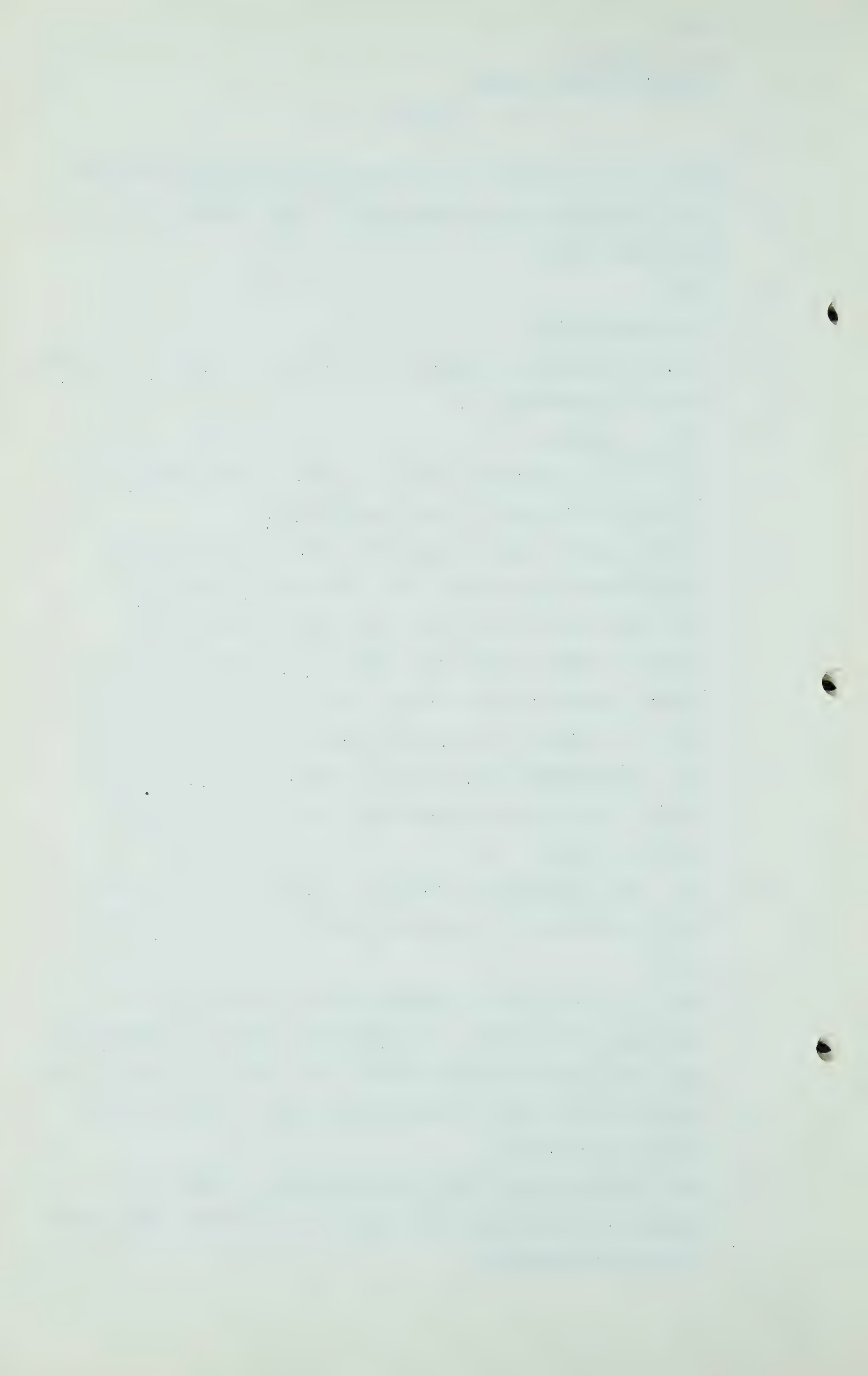
A On the summary table on page 23 it will be noted that manufactured gas sales to the industrial customers is presently about 12% of the total sales. In order to justify or make a pipe line feasible, we would have to greatly expand the sale of gas, and this enlarged market would, to a great extent, be obtained from the increased sale of industrial gas, both firm and interruptible. The controlling factor, we might say, would be the sale of industrial gas.

Q Now, those expressions "firm" and "interruptible", we have had them before, but perhaps you will tell us what they mean?

A Well, the firm power is demand power that has to be delivered at any time. Interruptible power is interruptible when the load factor has reached the peak in the sale of gas.

Q In other words, the consumer would have to rely on some sort of stand-by?

A Yes. Interruptible gas, we could sell it during the summer time, and during the winter time in heavy peak loads it would be cut off.



R. S. Davidson,  
Dir. Ex. by Mr. Nolan.

- 250 -

Q What is the percentage as between your industrial sales at the end of the 5th year as compared with the sales of gas for all other purposes? Have you that figure?

A Yes, it is on page 23. As I have just said previously, our industrial sale of gas presently is about 12 per cent.

Q You say your industrial is about 12?

A Yes, at the present time.

Q Yes?

A As shown on page 23.

Q Yes, that is right. I have got it.

A Our greatly increased volume of sales of industrial gas will be approximately 41 per cent of the total sales.

Q 40.8 per cent?

A That is correct.

Q Yes, I see. Now you were requested by this applicant to make certain studies, and you have done so, have you? I mean apart from what is contained in this report?

A Yes, we have done some additional work at the request of the applicant.

Q Now, this question was put to you: At approximately an average cost to you of 30 cents per Mcf. how would the estimate in your brief be affected?

A An average price of 30 cents at the city gate falls very closely into our line of thinking in these estimates, and it would not, in our opinion, materially affect, one way or another, these present estimates. After all, they are estimates.

Q Yes. Well, putting it another way, you could retain your present volume?

A Yes. That is, we would anticipate we would retain at least our estimate that we have made.





R. S. Davidson,  
Dir. Ex. by Mr. Nolan.

- 251 -

Q You anticipate you would retain your estimate?

A Yes, our estimate.

Q Well, then, you were asked what a cost to you of 35 cents per Mcf., how that would affect your estimate?

A The increased cost of gas, of course, brings in the consumer reaction.

Q By that you mean?

A His ability to pay.

Q Yes.

A And we feel that it is possible that we will retain our market at 35 cents. In some categories it becomes rather a balanced business whether it is obtained or not. That is, we might lose it and we might retain it. The estimates might stand as they are.

Q Now, in what field are you speaking of, industrial, commercial or domestic?

A I am talking in the industrial field, that is where the price factor is most acutely felt.

Q So that it is still within your price range at 35 cents?

A Yes, it is in the upper levels of the price range.

Q On the high side of your price range, is that a fair way of putting it?

A Yes, that is correct.

Q How would your estimate be affected with gas at 40 cents per Mcf.?

A At 40 cents the reaction we feel would be definite. The interruptible load, which has to be sold at an attractive price, would be wiped out. The effect on the volume would then affect the whole picture.

Q Because of the loss of the interruptible market?



R. S. Davidson,  
Dir. Ex. by Mr. Nolan.

- 252 -

A That is correct.

Q And how would it affect the whole picture?

A Our thought in this matter will range between 25 and 35 per cent of the total load would be lost.

Q Yes? And how would that affect your firm industrial?

A Well, it is going to - we are at a disadvantage, we haven't got the prices beyond that - but it is going to weaken our position with firm industrial at higher prices as well.

Q Yes?

A I should say that the 25 to 35 per cent includes the loss of a certain amount of firm industrial as well as the total loss of interruptible.

Q And would it have some effect on the commercial market?

A No, we do not feel it would have any effect on the commercial market.

Q But it would upset your whole basis of estimate?

A The basis of our thinking is upset entirely.

Q And there is just one other thing I would like to ask you, Mr. Davidson, is it the intention of your company, in the event of natural gas being imported into British Columbia, to sell that gas as a raw material?

A No, sir. I made that quite clear.

Q You mean in your brief you did?

A Yes, and in my previous examination.

Q Yes?

A That there was no consideration given in the estimate, nor do I think it is feasible to sell gas on that basis to be used as a raw material.

Q All right, thank you very much.





R. S. Davidson,  
Cr. Ex. by Mr. S. Bruce Smith.

- 253 -

CROSS-EXAMINATION BY MR. S. BRUCE SMITH.

Q Mr. Davidson, the British Columbia Electric Company distributes electrical power in substantial areas in British Columbia?

A Yes.

Q And in greater Vancouver?

A That is correct.

Q And it has been in the business for many years?

A Yes.

Q Now, you are an industrial analyst, I believe?

A Yes.

Q A University graduate?

A No, I am not.

Q But your specialty is analyzing markets of that kind for your company?

A That is correct.

Q Analyzing markets and that kind of work?

A Yes.

Q And you have been in that for some years?

A Yes, I have been with the B.C. Electric since '43 or '44 in this particular line.

Q And the company maintains research and statistical surveys related to markets and business of that kind?

A That is correct.

Q I suppose, would it be fair to say your company and you consider yourselves to be in an advantageous position to estimate markets in Vancouver?

A Yes. With reference to that, Mr. Smith, whether people are gas customers or not of the company, we are still usually serving them with electricity and have accessibility to them.

Q Well, you consider you would be in as advantageous a position



R. S. Davidson,  
Cr. Ex. by Mr. S. Bruce Smith.

- 254 -

as any group of business men to estimate the requirements and the demands of Greater Vancouver insofar as the supply of natural gas is concerned?

A I think we are in a very, very favorable position through our various businesses.

Q Now, I would like to compare certain figures which were given earlier before this Board on the application of Westcoast Transmission Company in relation to market for natural gas at Vancouver, and I am turning to what was Ford, Bacon & Davis' exhibit No. 2, I am sorry but at the moment I do not remember what exhibit it was in at that hearing, but it is the brief on Market for Natural Gas, and it is Ford, Bacon & Davis' exhibit No. 2.

MR. McDONALD: Exhibit number 39, Mr. Smith.

Q MR. S. B. SMITH: Exhibit number 39 of the Westcoast application. And perhaps, Mr. Davidson, you will accept from me the figures that I have extracted from that report, and I am turning to your Table No. 5 in your brief, and I am going to compare some figures that were given in that brief, the brief exhibit 39, in relation to the market in Vancouver. Would you mind turning to your Table No. 5?

A I have it.

Q And I am going to the 5th year, the 1956, under "Annual Sales in Mcf. by Customer Classes." That is the middle group?

A Yes.

Q Over at the right-hand side of the page?

A Yes.

Q And under the heading "Domestic" you give a figure of





R. S. Davidson,  
Cr. Ex. by Mr. S. Bruce Smith.

- 255 -

3,468,000. That is your best estimate?

A That is our best estimate.

Q Now, in the exhibit I have referred to, filed by Westcoast Transmission Company, they gave a figure in place of yours, 3,468,000, of 4,839,000 annual sales in Mcf. by customer classes of domestic consumers. In your opinion, then, I take it, that this Westcoast Transmission Company's figure of 4,839,000 for domestic consumers is high?

A Yes, we have estimated 3,468,000.

Q They are considerably higher?

A Yes. It is, I would say, 30 per cent or something.

Q Now, going to the next figure "Commercial", your figure is 885,000 and the Westcoast Transmission Company, in the same brief, gives a figure of 1,613,000. Again you would say that Westcoast's estimate is very considerably high? It is practically double what your estimate is.

A 1,116,000?

Q 1,613,000.

A 1,613,000?

Q Yes. I am reading from a statement, No. 2 in their exhibit?

A Yes.

Q You would agree in that?

A Yes. We have, as pointed out in my brief, we have considerable commercial business in the City of Vancouver.

Q And you are in a good position to estimate commercial requirements of natural gas?

A We feel so.

Q You believe you are?

A Yes.

Q Now, going to the next item "Industrial - Firm", your figure



R. S. Davidson,  
Cr. Ex. by Mr. S. Bruce Smith.

- 256 -

was 1,306,000 and the comparable figure given by Westcoast was 1,590,000. That is slightly higher but not as greatly out of proportion as the other figures. Again you would say that your estimate you consider to be the best estimate, in your opinion?

A Naturally.

Q Going to the next figure of "Interruptible" - by the way, the interruptible is a very important figure, isn't it?

A Extremely.

Q Extremely important?

A Yes.

Q Your figure is 1,692,000, Westcoast's figure - in this case they have decreased your figure to 1,500,000. They have increased the others but they decreased interruptible. Again you would stand behind your own figure?

A We feel that 1,692,000 was a reasonable estimate that we could obtain in the interruptible sales.

Q Are you in a position to tell us what the result of increasing the domestic consumers, commercial consumers, industrial firm consumers and reducing the interruptible would be as compared with your figures?

A Well, it is going to have considerable effect on the load factor.

Q Yes. Would it decrease the load factor?

A Oh, yes, it would be decreased.

Q And if those figures, on those two comparable sets of figures, would it be correct to suggest that the load factor would be decreased very materially? Perhaps you are not in a position to say?

MR. C. E. SMITH: Decrease in whose figures, his or





H-2-j

R. S. Davidson,  
Cr. Ex. by Mr. S. Bruce Smith.  
" " " Mr. Fenerty.

- 257 -

Westcoast's?

MR. S. B. SMITH: I beg your pardon?

MR. C. E. SMITH: Decrease in whose figures, his or  
Westcoast's?

Q MR. S. B. SMITH: The load factor would be decreased  
if the Westcoast's figures were correct, the figures would  
be reduced in comparison with the figures you have given.

A Yes, our load factor was given as 58.7 per cent in the 5th  
year and the Ford, Bacon & Davis report, I believe, is  
something less than 50 per cent. I am not quite sure.

Q Thank you very much, Mr. Davidson.

CROSS-EXAMINATION BY MR. FENERTY.

Q Mr. Davidson, I gather from the fact that you are present  
giving evidence, and Mr. Mainwaring is here giving evidence,  
that your company is prepared, and indeed anxious, to get  
into the natural gas distribution business on the basis of  
a return on your rate base of  $5\frac{3}{4}$  per cent, is it?

A 5.3 per cent.

Q 5 - -

A 5.3 per cent.

Q 5.3 per cent?

A Yes.

Q That is so, is it not?

A That is correct.

Q That is quite interesting to us here in Alberta. Now, at  
the bottom of page 9 of the submission of Mr. Copp, Exhibit  
5, we have the statement "Present price of heavy industrial  
fuel oil PS400 and Bunker C in barge deliveries dockside  
at Portland and Seattle is approximately \$1.55 per barrel,  
May 11, 1950. For natural gas to be competitive with fuel



R. S. Davidson,  
Cr. Ex. by Mr. Fenerty.

- 258 -

oil at this price it would have to sell at about 25 cents per Mcf.". Now, if you substituted the City of Vancouver for those cities, to sell gas for industry on a competitive basis with the fuel oil, would it be 25 cents or what price would it be at Vancouver?

A Mr. Fenerty, there are different oil prices depending on the customers.

Q I mean, so that it would be competitive, I am just asking what you would sell gas for for industry?

A An average price of the gas to us at 30 cents keeps us in the range of selling this estimated volume.

Q No, no. I don't want your average price, I want your price to industry corresponding to this 25 cents?

A We have firm and interruptible loads. There are two different prices there.

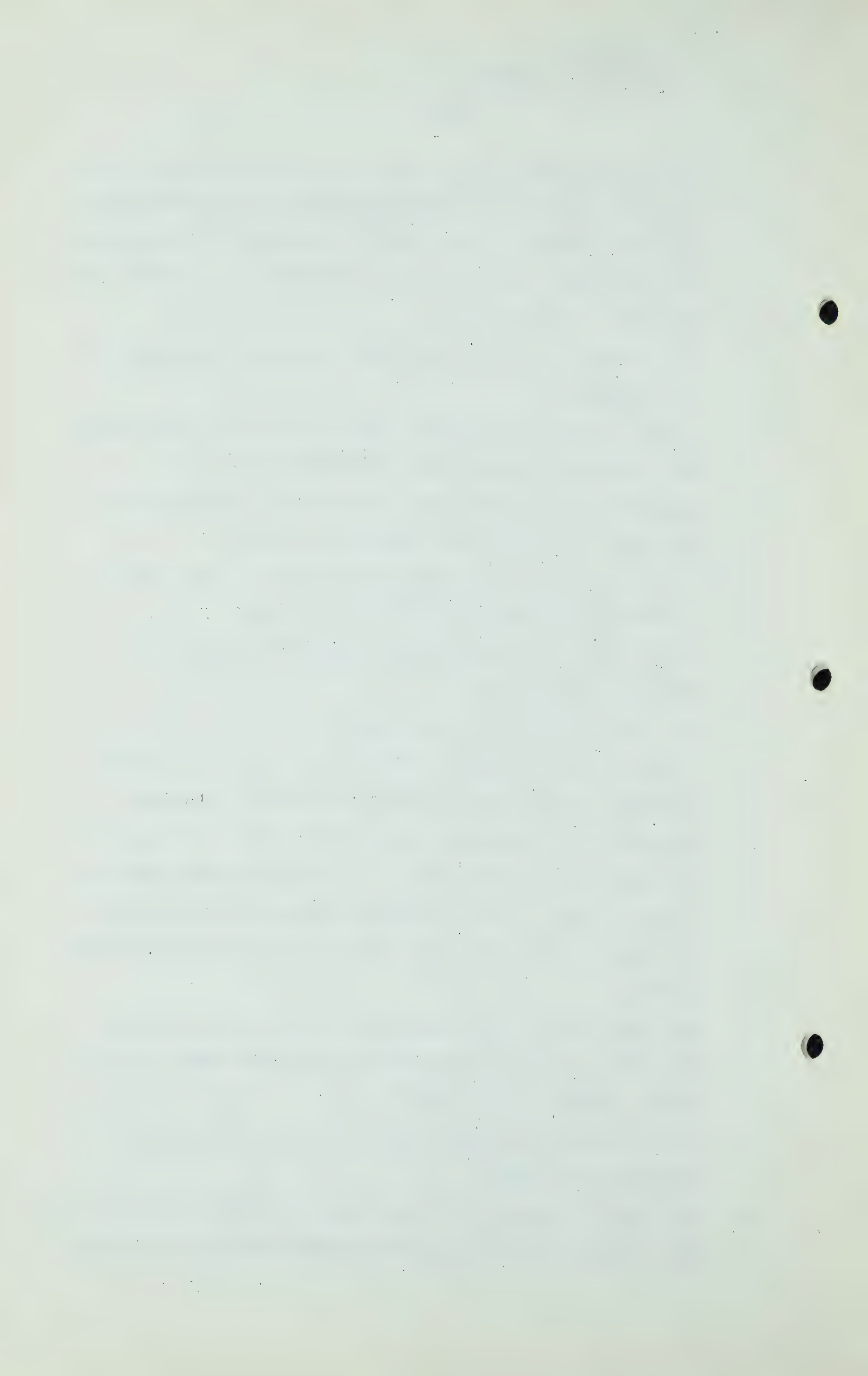
Q Yes. Let us take the firm loads?

A We would have to compete with oil at, on the firm basis of consumers, around 40 to 42 a million BTUs, and on the industrial interruptible load we would have to compete on the basis of about 34 cents. I am figuring this way, Mr. Fenerty, that the interruptible customers will be large, very large industries, that are able to get oil at reduced prices.

Q And your price to them would be, we will say, average 34 cents to your interruptible customers? Those are the lowest prices, aren't they?

A We would have to compete with oil at 34 cents on the interruptible basis.

Q Now, wait a minute. You would have to compete with oil with the result that if your interruptible industry, for your





R. S. Davidson,  
Cr. Ex. by Mr. Fenerty.

- 259 -

interruptible industrial you would have to charge what per thousand?

A It would be something less than 30 cents a thousand there.

Q Something less than 30 cents?

A Yes.

Q Yes. I see. And assuming - just make this assumption with me - that you will not sell any gas to any customer at less than actual cost, perhaps even assuming that you could not do so, as a matter of law, as being discriminatory, just make the assumption at the moment, will you just tell me on the basis of 30 cents to those industrial customers you have mentioned what price you could pay or would pay for that gas? You are going to have a fixed price for all of the gas, are you, from your vendor?

A I have just said, Mr. Fenerty, that to compete with these prices, we feel that we can hold our market at a price, an average price of 30 cents at the city gate.

Q But are you figuring different prices at the gate for different categories?

A No, an average.

Q Well, then, a price of 30 cents, there is no average when you buy your gas is there? You just buy it at so much a thousand?

A That would be the average price.

Q Just a minute, why do you say an average price, are you going to buy some at 15 and some at 40?

A There will be an average.

Q I am talking about buying, not distributing?

A There will be a maximum day and a commodity charge, I presume, as a standard practice.



R. S. Davidson,  
Cr. Ex. by Mr. Fenerty.

- 260 -

Q In buying gas for distribution?

A Yes.

Q You figure there will be a sliding scale, do you, depending on the amount you purchase?

A Yes.

Q From the vendor?

A Yes.

Q I see. We do not have it here, you know; I did not know whether you had it in some other place. An average price of 30 cents and your lowest price to a consumer will be 30 cents?

A No. I said that we would have to compete.

Q I know, you told me that, and that is the reason that I want to know what the price is to compete?

A There may be a commodity charge which is very low.

Q Yes?

A On this gas.

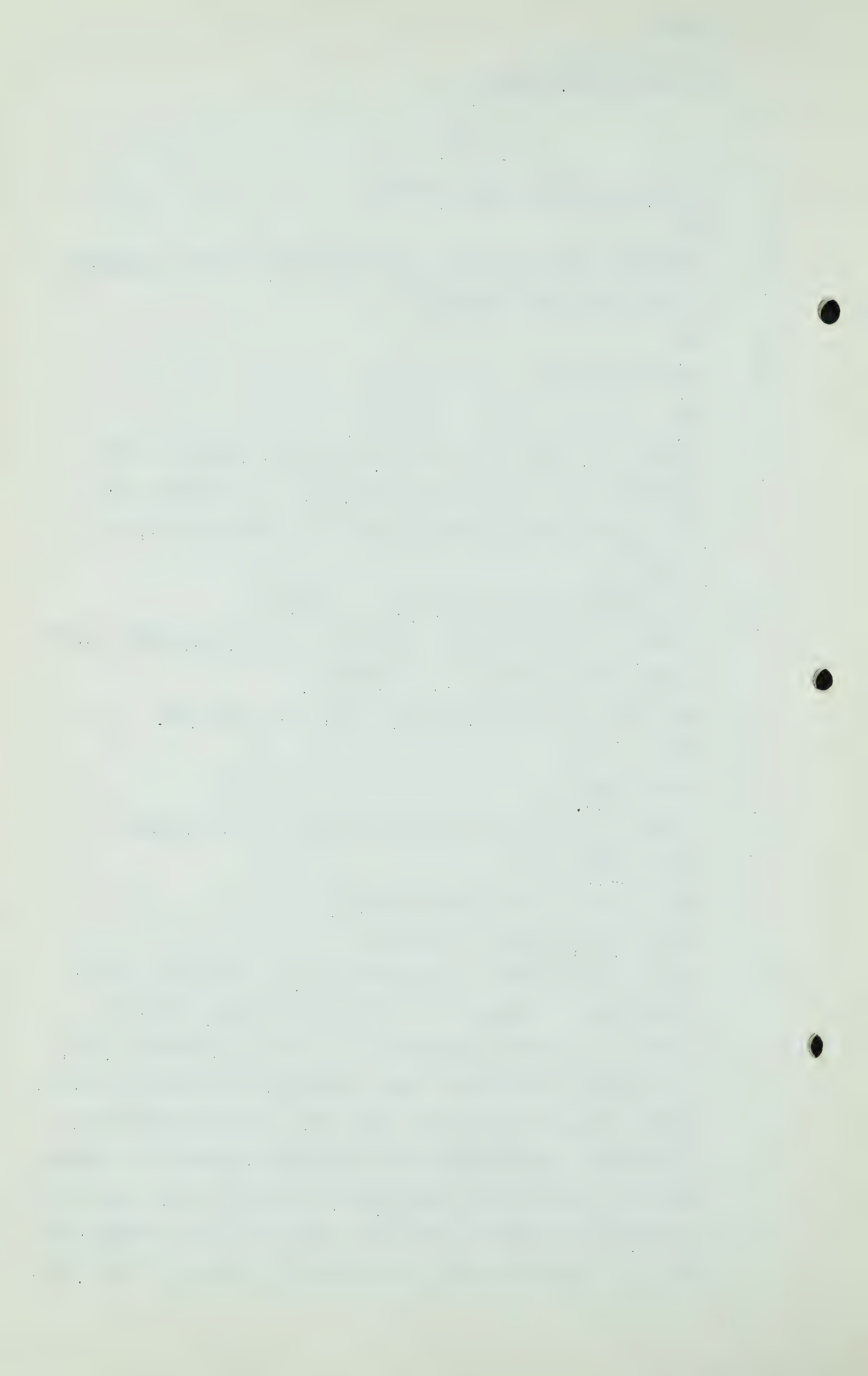
Q It may be more than 30 cents that you have to charge?

A The average.

Q The low cost, to the manufacturer?

A Domestic prices will be higher.

Q I will tell you what I am getting at, Mr. Davidson, and I am not really concerned with what you charge, and it is probably none of my business, but I have a conception, and I am talking of Alberta, that the manufacturers are entitled to have charged to them the same price as your manufacturer in Vancouver and Portland, they are all intermediate charges, and I want to find out what the cost of gas at the well head is going to be here in order for you to meet the competition that you talk about, and I have only one thing from you, and





R. S. Davidson,  
Cr. Ex. by Mr. Fenerty.

- 261 -

I hope to get it from others later as I go along, and I am trying to find out from you, I have got your average price of 30 cents at the gate, and I thought you said that your lowest price was 30 cents, but you now say it might be a little more because of a service charge to certain manufacturers?

A No, no. I said maybe the price would be higher to domestic consumers. To get the industrial customers we would have to have a competitive price of around 30 cents with oil, so that we would have to sell interruptible gas at 30 cents.

Q You would have to sell interruptible gas at 30 cents?

A Yes.

Q And your average that you will pay, as an average, is 30 cents you figure?

A Yes.

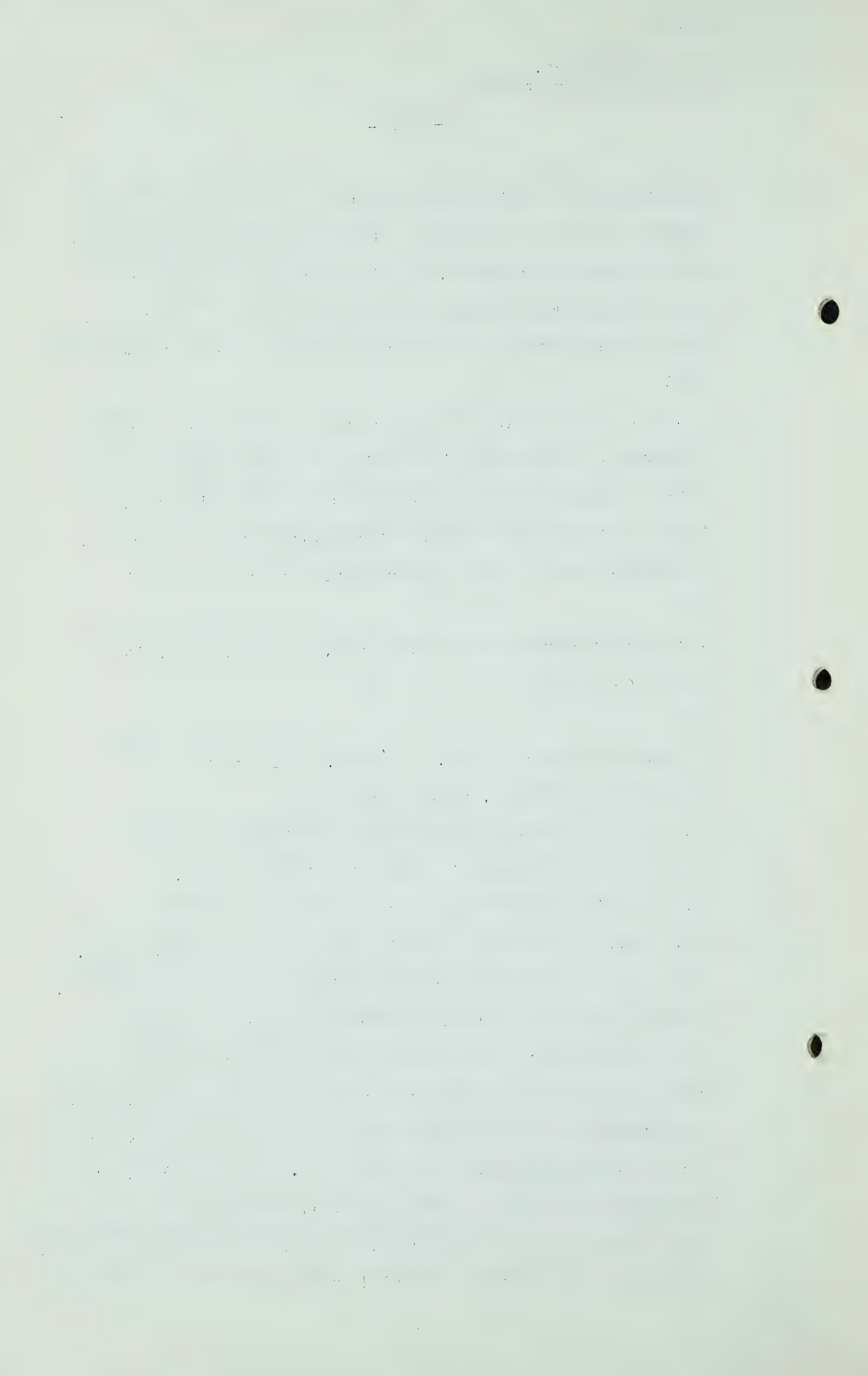
Q So that you would not be, at least, selling at a loss to industrial customers, we have got that?

A No, we do not anticipate selling anything at a loss.

Q The only loss you have is your distribution cost?

A No, that will average out on the commodity charge.

Q Now, look, I have been through this for a good many years, and I am not going to keep on talking to you about averages, because I am not interested whether you load on your domestic consumers and have the industrial at a loss. I want to talk about these industrial consumers. As far as I am concerned, you can charge your domestic consumers \$1.50 to keep somebody operating at the dock. I do not care, it is not my business. I want to find out what your cost is that you sell to the industrial, the lowest priced industrial, what the lowest priced industrial gas is going to cost you



R. S. Davidson,  
Cr. Ex. by Mr. Fenerty.

- 262 -

and what you are going to sell it for. Now, I don't care if it is discriminatory. I do not care if you are going to sell it at what it costs you, with a loss to yourself, but I want to know what you are going to do about it?

A We anticipate it will be in the neighbourhood of 30 cents for the cheapest gas.

Q You are going to buy the gas at 30 cents and sell to your lowest industrial consumer at an average of 30 cents, without reference to your distribution?

A I don't know whether I understand that.

Q If I get you right, you are going to buy gas at 30 cents and you are going to sell the gas at your lowest rate to the industrial at 30 cents, and you are going to pay the distribution charges yourself?

A You may figure it that way but we do not.

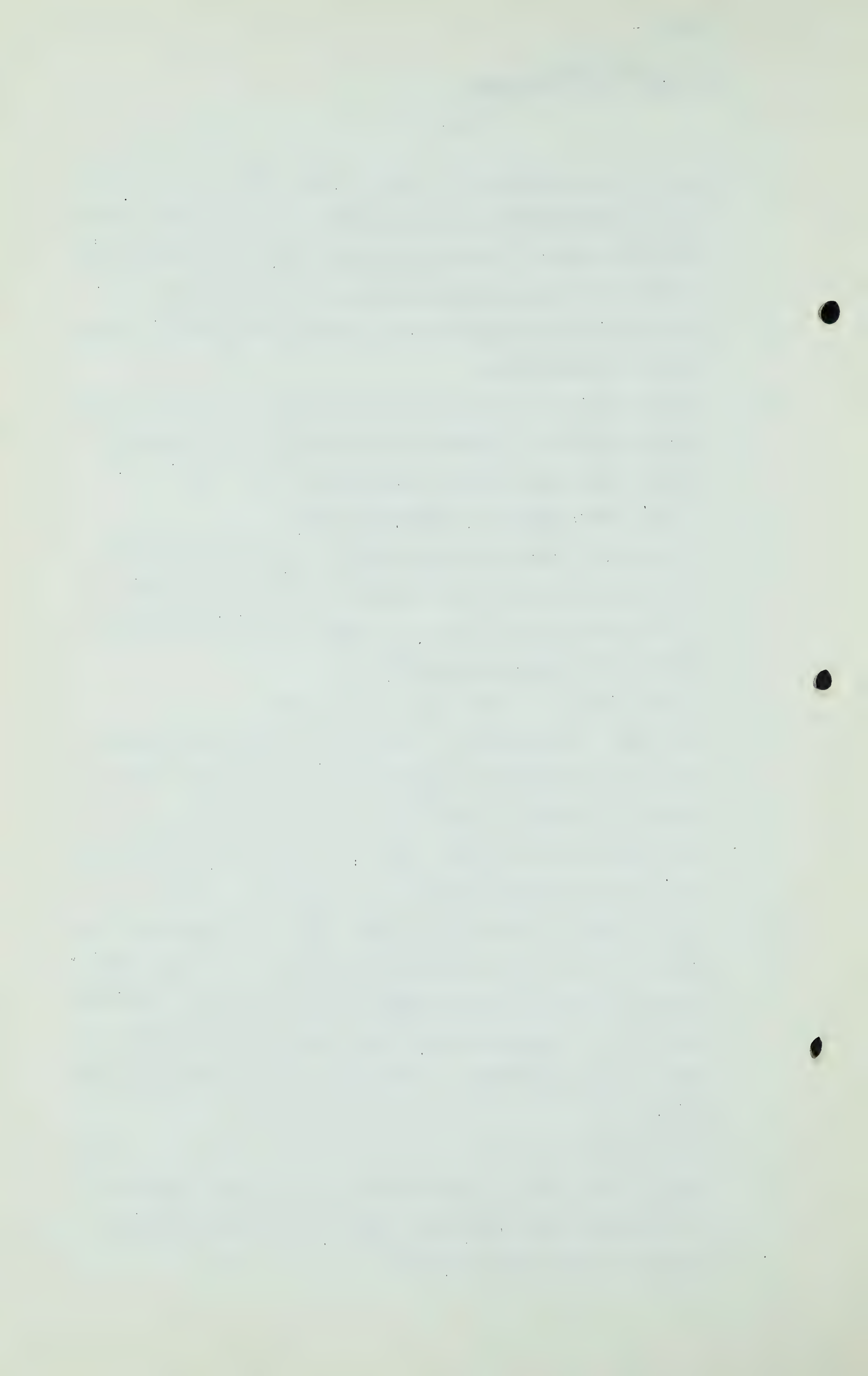
Q All right. You figure it this way, you are not going to bear this distribution charge because some other class of consumer is going to bear it?

A The average price of gas. There is one thing in there and that is the commodity charge is in there.

Q I would hate for you and I to get into a discussion on that. Now, do not let us fence with each other. I am not concerned with what you are going to do as long as I find out what it is. I have got this, you are going to sell at 30 cents to some customer and you are going to buy at 30 cents for him?

A That is correct.

Q And you are going to continue to sell to those customers at 30 cents even though your average price goes up as a result of not using as much?





H-2-p

R. S. Davidson,  
Cr. Ex. by Mr. Fenerty.

- 263 -

A That price is based on the estimates that we have made. Now, there may be changing conditions.

Q All right. I am not concerned with that. You will in some way internally take care of your distribution costs with reference to those customers because you have a different scale of prices to different customers?

A Yes, we will endeavour to arrange that.

Q Yes. Now, then, have you any way of working out and telling me if you are buying gas to distribute to industrial customers only at 30 cents, in order not to lose money, what you would have to buy your gas for? Can you give me even a guess?

A I am sorry, I couldn't, the distribution, well, it is just impractical, because your ramifications are too wide.

Q I want to know what your distribution a thousand is, that is the share you pay I am talking about, you have got that worked out, haven't you? Your cost of it varies, I suppose, with your customer?

A Yes, with the number of customers, that is the point.

Q I see. The distribution to small houses is very different from distribution to some other customers?

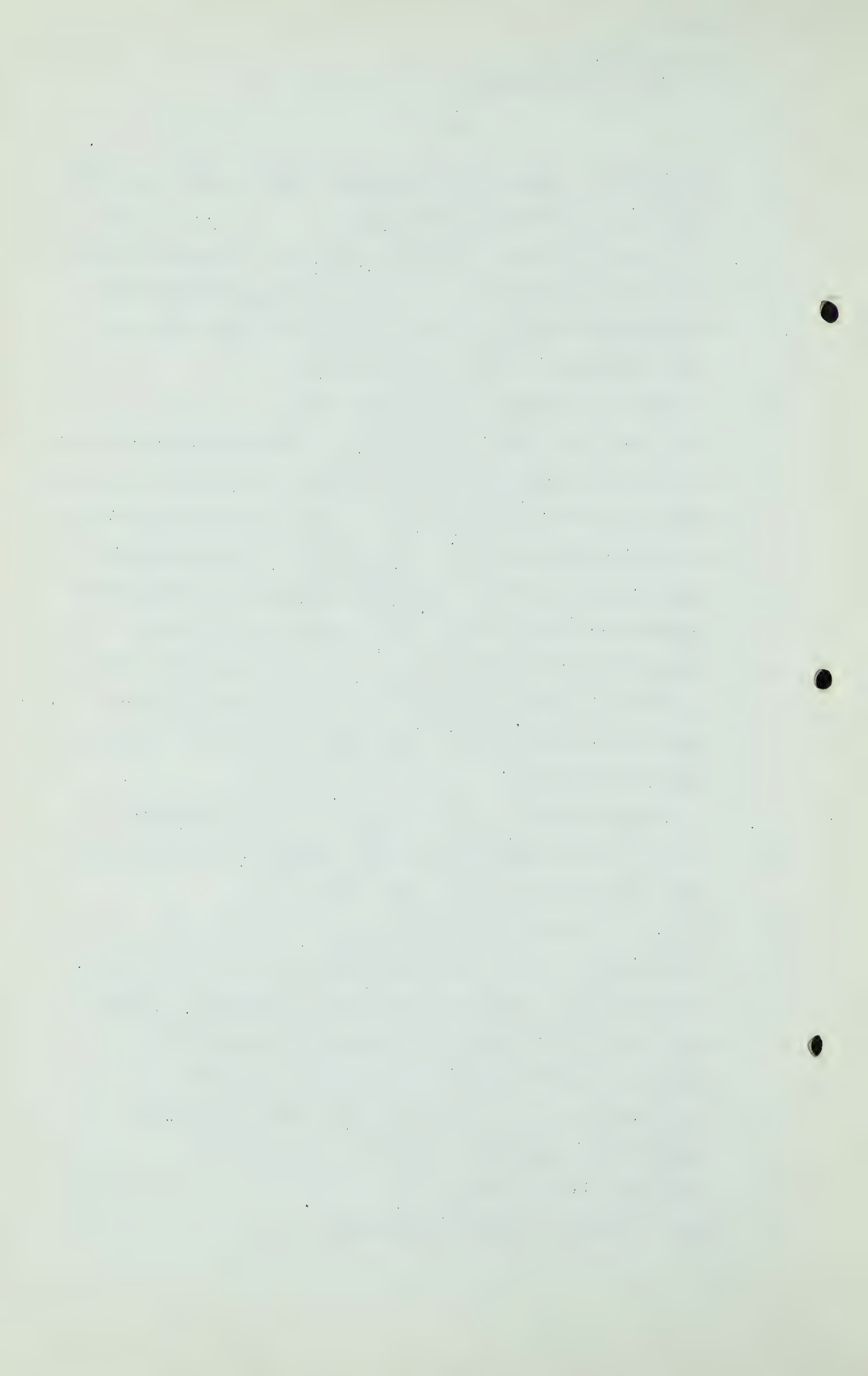
A Yes, it is impossible just to say.

Q I don't want to waste too much time, but it will help me if you will give me some idea, just an approximate idea, of what your service charges in the distribution, as it relates to industrials that buy gas at 30 cents?

A Well, the over-all cost, we have an over-all cost of distribution, and I would say that is about - -

Q Very well, give me that?

A They are about 8 cents a thousand.



R. S. Davidson,  
Cr.ex. by Mr.Fenerty.  
" " " Mr. Smith.

- 264 -

Q I was in hopes you could.

MR. MAHAFFY: He said 8 cents a thousand.

Q MR. FENERTY: I did not hear that. Oh, 8 cents  
a thousand. All right. That is your over-all?

A That is the over-all, yes.

Q Would it not be fair to say that it did not cost you anything  
like that to distribute to industries?

A No.

Q You could not give me any deduction that you would make from  
that?

A No, I could not.

Q MR. C. E. SMITH: May I ask you one question, Mr.  
Davidson. You were present and you heard Mr. Mainwaring say  
that your company was very much interested in the question  
of reserves in the Province of Alberta, having regard to this  
particular situation. That is correct, is it?

A Yes, sir.

Q You will agree with me that you are primarily interested in  
proven reserves?

A I have not considered the matter. I have not got that far  
along.

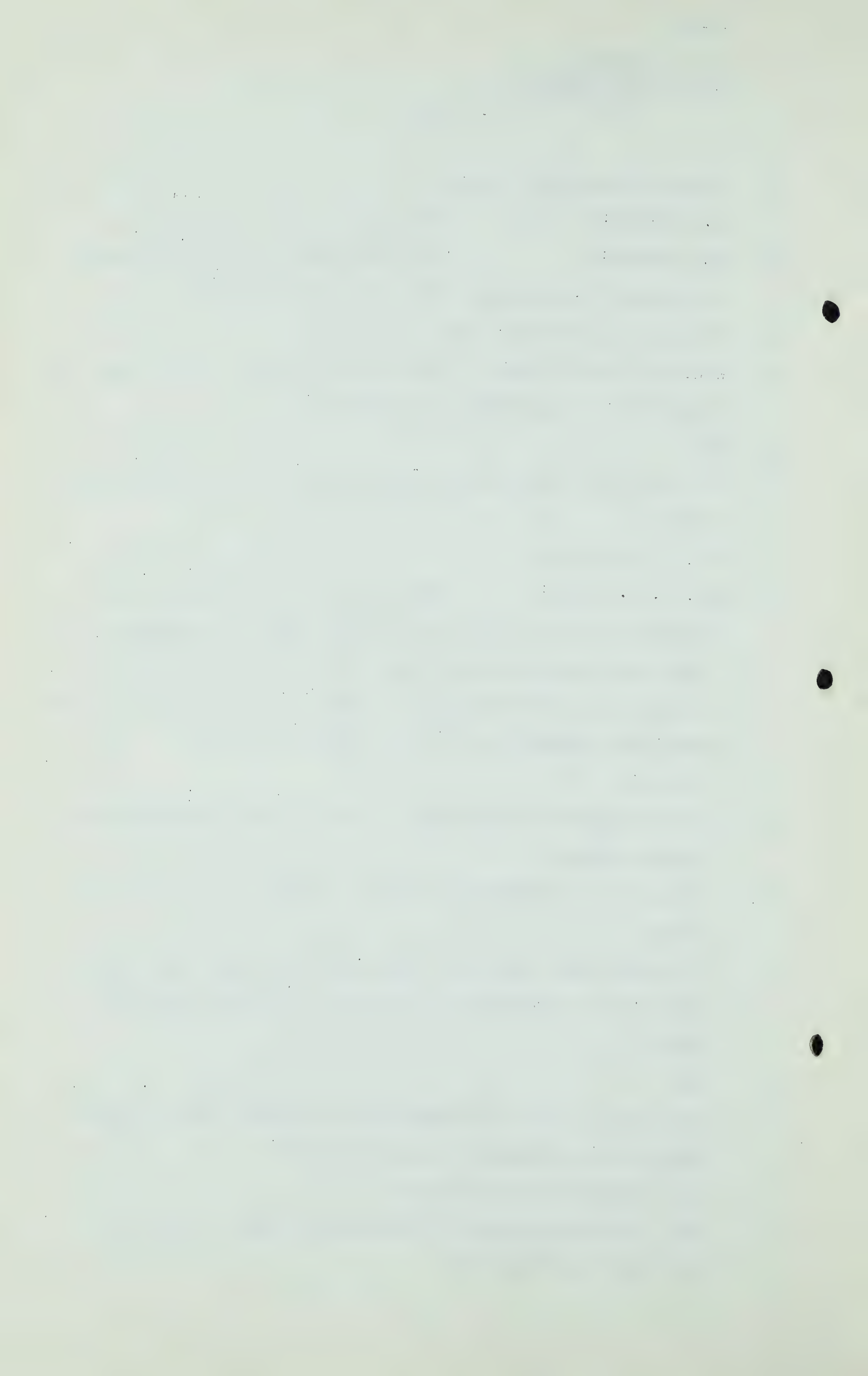
Q I thought maybe you had. Well, will you agree with me in  
this that if something is proven we can accept that as a  
fact?

A Yes.

Q And I take it that if something is probable you will agree  
with me it is likely to become a fact?

A Yes. I think I can say that.

Q And if it is potential it may become a fact. Is that a  
fair way of putting it?





R. S. Davidson,  
Cr. ex. by Mr. Frere.

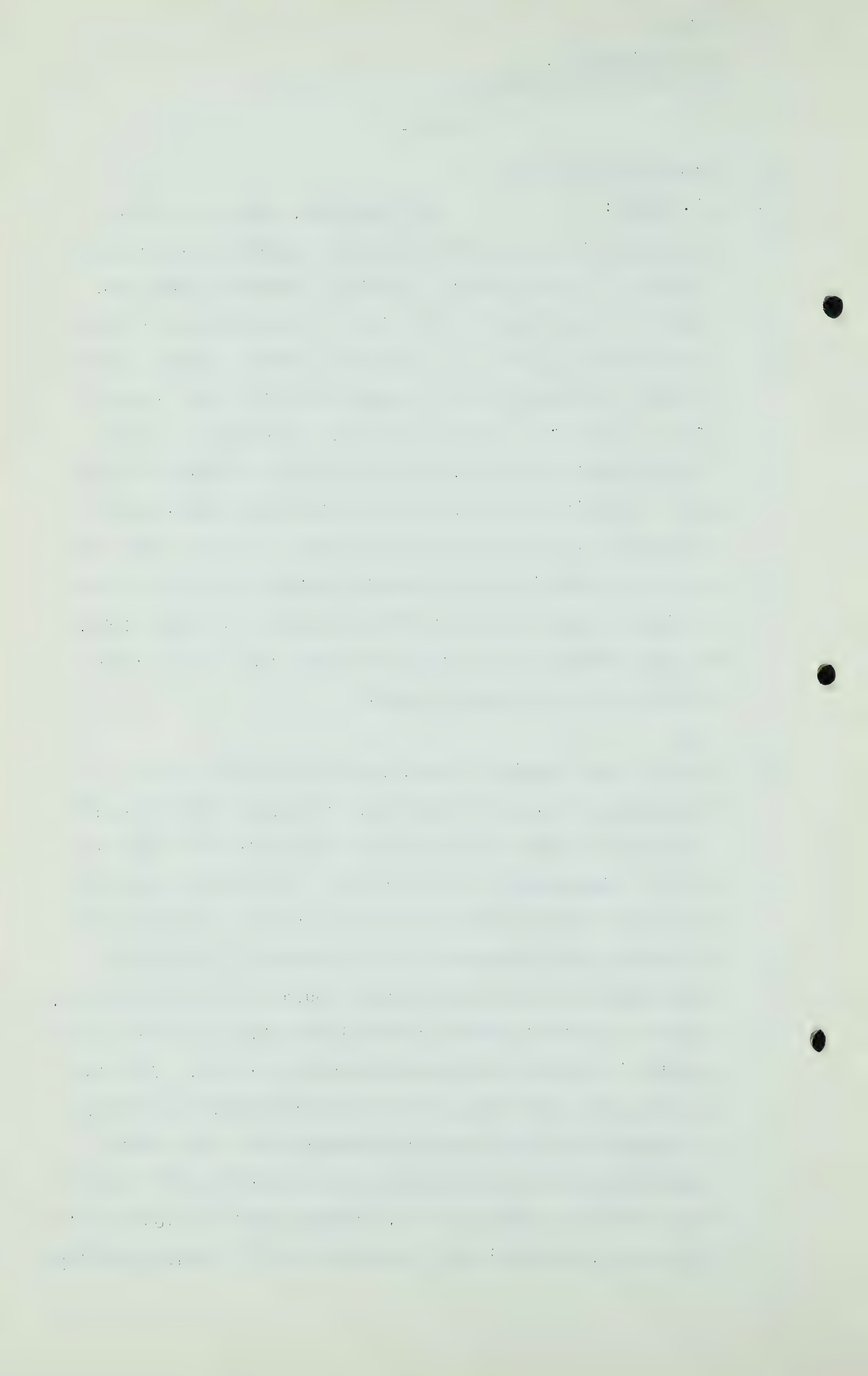
- 265 -

A That would be fair.

Q MR. FRERE: Mr. Davidson, just one or two questions. I am not quite sure that I understood all your answers to Mr. Fenerty but I think I understood what Mr. Fenerty was getting at. But just for my own benefit would you elaborate on what you told him? First, I shall have to do what Mr. Fenerty did and assume certain things and ask you to assume those things with me. Supposing you had a certain quantity of gas, a certain number of cubic feet of gas, coming into the main transmission line that arrived in Vancouver. If you could take out that gas at the same rate as it is coming in over a certain period of time that would be what you would call a 100% load factor. Is that right? In other words, it is a constant supply and on the other hand you have a constant demand?

A Yes.

Q And that gas, we will assume, would be supplied to you at an average price, as it would be, of around about 30 cents and we will assume that your cost of distribution would be in the neighbourhood of say 2 cents. Then if you have an industrial customer who could take that gas at practically a constant load factor and on the other hand who had an interruptible load, this is what I would like you to tell me, would it be unreasonable for that industrial customer to get his gas at perhaps something less than 32 cents? That is to say, get a price less than the others because his load, as compared with the domestic consumer load, has certain characteristics and it would pay you to perhaps sell gas to him at what, on the face of it, might seem like a loss but is not because you take into consideration the demand, commodity



T-2-3

R. S. Davidson,

" " " Mr. D. P. McDonald.

- 266 -

and customer cost?

A . That is right, yes.

MR. NOLAN: If no one else is going to ask any questions, should we recess just now?

THE CHAIRMAN: Unless anybody else wants to cross-examine Mr. Davidson.

MR. D. P. McDONALD: I have some questions.

THE CHAIRMAN: Then we will adjourn.

(At this stage the Hearing was adjourned for a short recess.)

CROSS-EXAMINATION BY MR. D. P. McDONALD.

Q Mr. Davidson, can you tell me if in your brief you have dealt with the matter of fuel prices for million BTUs?

A No, I did not.

Q I did not think so. I could not find it.

A No.

Q In Exhibit 5 filed this morning and read by Mr. Copp, at page 9, he deals with fuel prices for million BTUs. In the first column he deals with Canada, that would be the Vancouver area prices and in Canadian funds. You will note in the coal, domestic price is here given as an average of 66 cents. I take it that means the average for all grades of coal that are used for domestic purposes. Do you agree with that?

A Yes.

Q It is close to the average?

A That seems to be close.

Q And the industrial coals, the price is 46 cents. Now that is on a BTU basis and consideration, as I read this exhibit, and has no regard to efficiency practices as between the use of coal and gas?

A No.





R. S. Davidson,  
Cr. Ex. by Mr. McDonald.

- 267 -

Q Those are just gross cost figures?

A That is what they appear to be.

Q There is such a thing as a difference in efficiencies between the use of coal and the use of gas in BTUs actually used to develop the power or heat?

A Yes.

Q Have you in your research arrived at any conclusion in regard to that on the basis of 1,000 BTU per Mcf. of gas? Is it 55 to 80 per cent or 55 to 70 per cent?

A There are all kinds of installations burning at various efficiencies.

Q But on the general average the gas is very much more efficient than coal?

A Yes.

Q So that on the dollar value there is a considerable margin in favor of gas, in the difference in price?

A Over coal, yes.

Q And similarly there is the matter of cleanliness in the use of coal, of gas against coal?

A Of gas, yes.

Q And there is the matter of storage?

A That is the collateral values, yes, that we usually refer to.

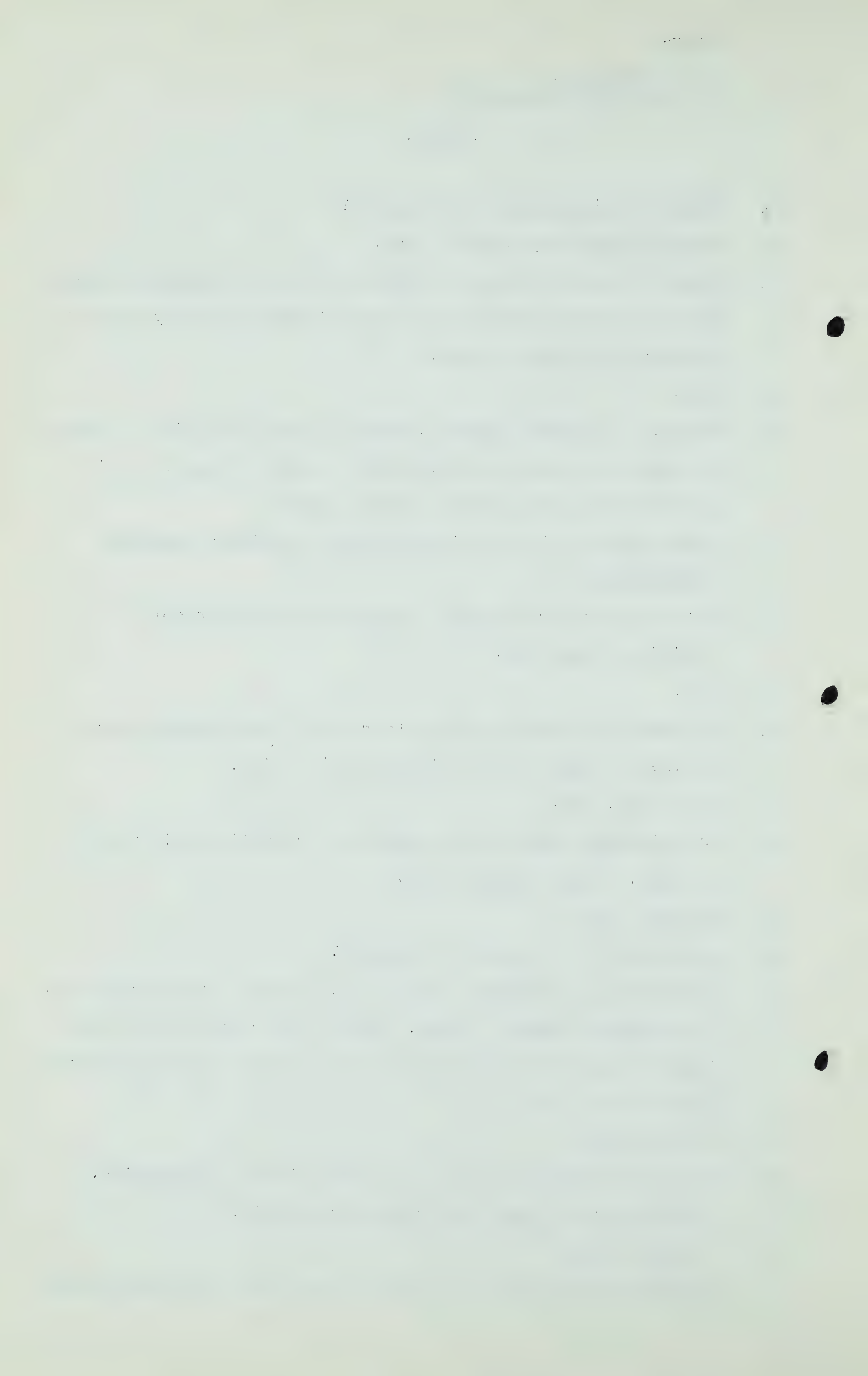
Q And handling charges, labor, stokers and conveyors and that type of thing is involved in the use of coal and not involved in the use of gas?

A That is right.

Q And those things have all to be taken into consideration in the price of gas, as I read this exhibit?

A I would agree.

Q But when we come to fuel oil is it not fair to say that fuel



R. S. Davidson,  
Cr. Ex. by Mr. McDonald.

- 268 -

oil and gas are very much closer in efficiency of use?

A Gas and fuel oil, the efficiency is very much closer, yes.

Q There is still some margin in favor of gas in most instances?

A Where you have gas installations. You could not transfer gas to say an oil furnace and expect the same efficiency, but where the installation is set up that would be correct.

Q And when you come to industrial oil, fuel oil, there is the question of storage to be taken into account?

A Fuel oil, yes.

Q Then there is the question of controls and power to feed the fuel oil to the firebox?

A The maintenance of steam, you mean?

Q Yes?

A Yes.

Q You require electricity in the use of power-driven fuel oil to the fireboxes?

A That is domestically.

Q Domestically?

A Domestically.

Q And industrially?

A Fuel is usually steam-driven there.

Q Oh yes. I did not just understand your reference to steam. But both are items in favor of gas that I have mentioned?

A Yes.

Q And there is another item I would like you to give some consideration to. Do you know the basis on which you can get long-term contracts for the firm delivery to you of fuel oil in Vancouver? I am talking about contracts for say 3 years or better? 2 years or better? Say 2.

A These oil prices are rather difficult to determine and we





R. S. Davidson,  
Cr. Ex. by Mr. McDonald.

- 269 -

have taken that into consideration in the question of the interruptible gas market, where the interruptible customer, that would be generally speaking a large customer, a large industry, they might be able to get oil at a cheaper price than is quoted or the set-up price. There is a variation in there.

Q But he cannot be sure now that a year from now he is going to buy his fuel oil at a specific price?

A You are referring to Bunker C?

Q Bunker C, or what we call here industrial fuel oil. Well, yes, refer to Bunker C.

A The small industrialist would not, might not be able to but the large industrialist is likely to be able to arrange fairly long term contracts. If he is taking a considerable volume.

Q Would he be able to arrange it say at a \$1.55 a barrel and guaranteed delivery a year from now?

A I am not saying \$1.55. Yes, I think he would be able to get it on a year's basis.

Q Would he be able to, say, 2 years?

A Yes, I think so.

Q 3 years?

A Now you are going into the future.

Q All right, the reason I mentioned that is I understand that - do you know what the crude oil price in California is at the present time?

A It is down considerably from 1948.

Q The crude oil price in California is \$2.50 per barrel. Do you recognize that figure?

A Yes.



R. S. Davidson,  
Cr. Ex. by Mr. McDonald.

- 270 -

MR. C. E. SMITH: What was that figure?

MR. McDONALD: \$2.50 a barrel. You have here in this Exhibit 5 where Bunker C fuel is being sold at \$1.55 a barrel?

A That is not in Vancouver.

Q Not in Vancouver?

A No.

Q Do you think under those circumstances you could really, a year from now or two years from now, be able to buy Bunker C fuel at \$1.55 per barrel?

A I do think that a large user would be able to arrange a year's contract anyway at a price like that. Of course the \$1.55 you refer to there is not our price in Vancouver.

Q I know that, but just as a general conception. So that anybody who is relying on these types of fuel, coal and fuel oil, and wants to forecast the cost of his operation from say 3 to 5 years in advance, insofar as power is concerned, he is at a disadvantage as compared with gas?

A Yes.

Q Depending on the contract that the other party could make with, say, the pipeline company?

A Yes. You are dealing there with firm industrial power?

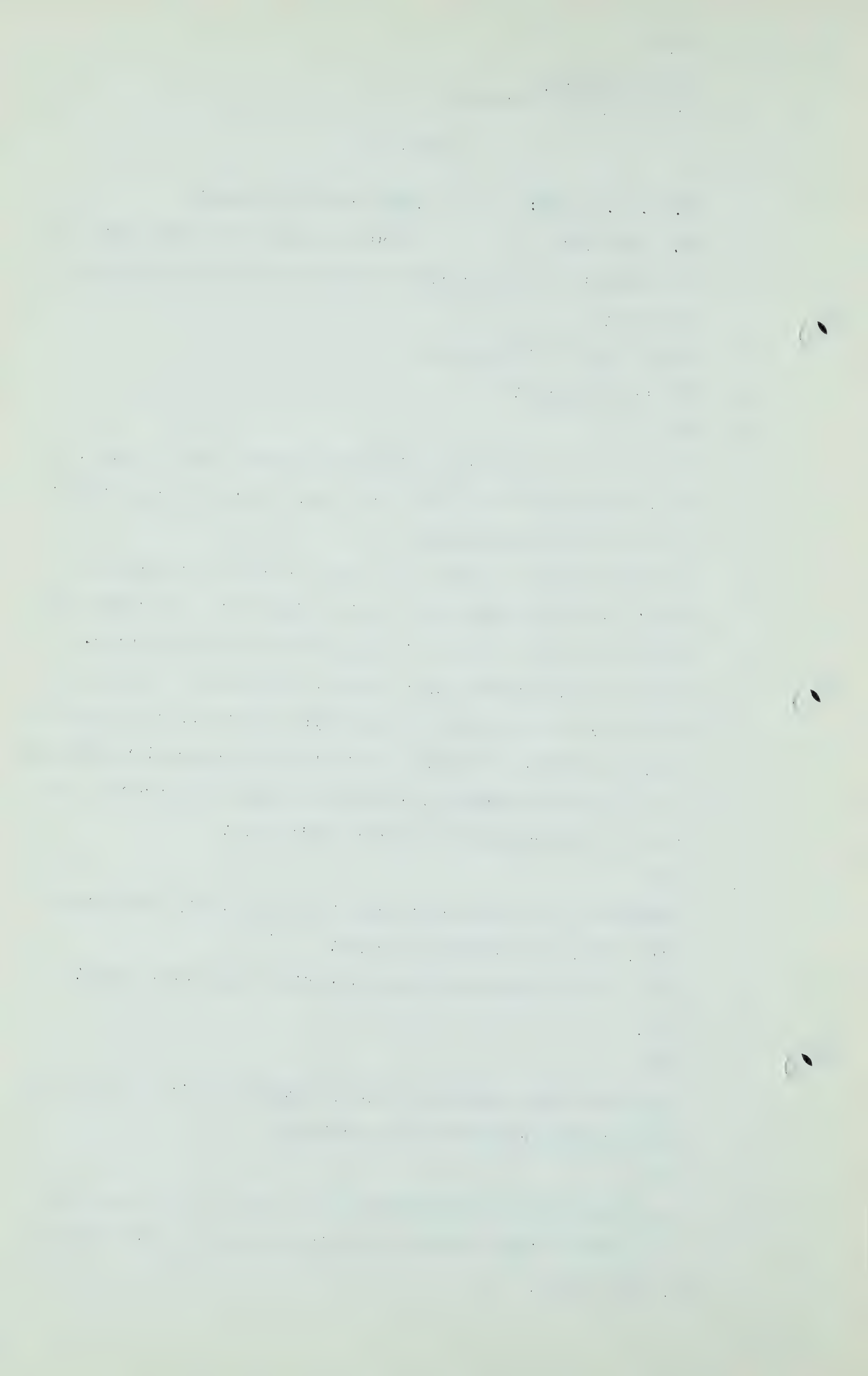
Q Yes?

A Yes.

Q You could make contracts that are good for five or ten years or whatever arrangement you arrive at?

A Yes.

Q And there are some advantages in the sale of gas that are to be taken into account in addition to these gross prices we have here?





R.S. Davidson,  
Cr. Ex. by Mr. McDonald.

- 271 -

A Unquestionably.

Q And that gets down to a matter of salesmanship and the contract between the company and its customer?

A Service and everything, that is included.

Q Mr. Smith referred to Exhibit 39 that was filed on the Westcoast Transmission application and I find on page 12 - I can hand you a copy of it, Mr. Davidson - estimated sales per domestic customer is tabulated. Do you notice that table at the bottom?

A Yes.

Q That is estimated sales per domestic customer in the 5th year, Vancouver, 52 Mcf.s, Seattle 65 Mcf.s, Tacoma 25 Mcf. and Portland 63 Mcf. per consumer. Now, did you make an estimate of what the domestic sales, estimated sales for domestic consumers in the 5th year would be in your submission just filed here?

A Yes, Table A. In the 5th year the average Mcf. per customer, domestic sales, 45.4.

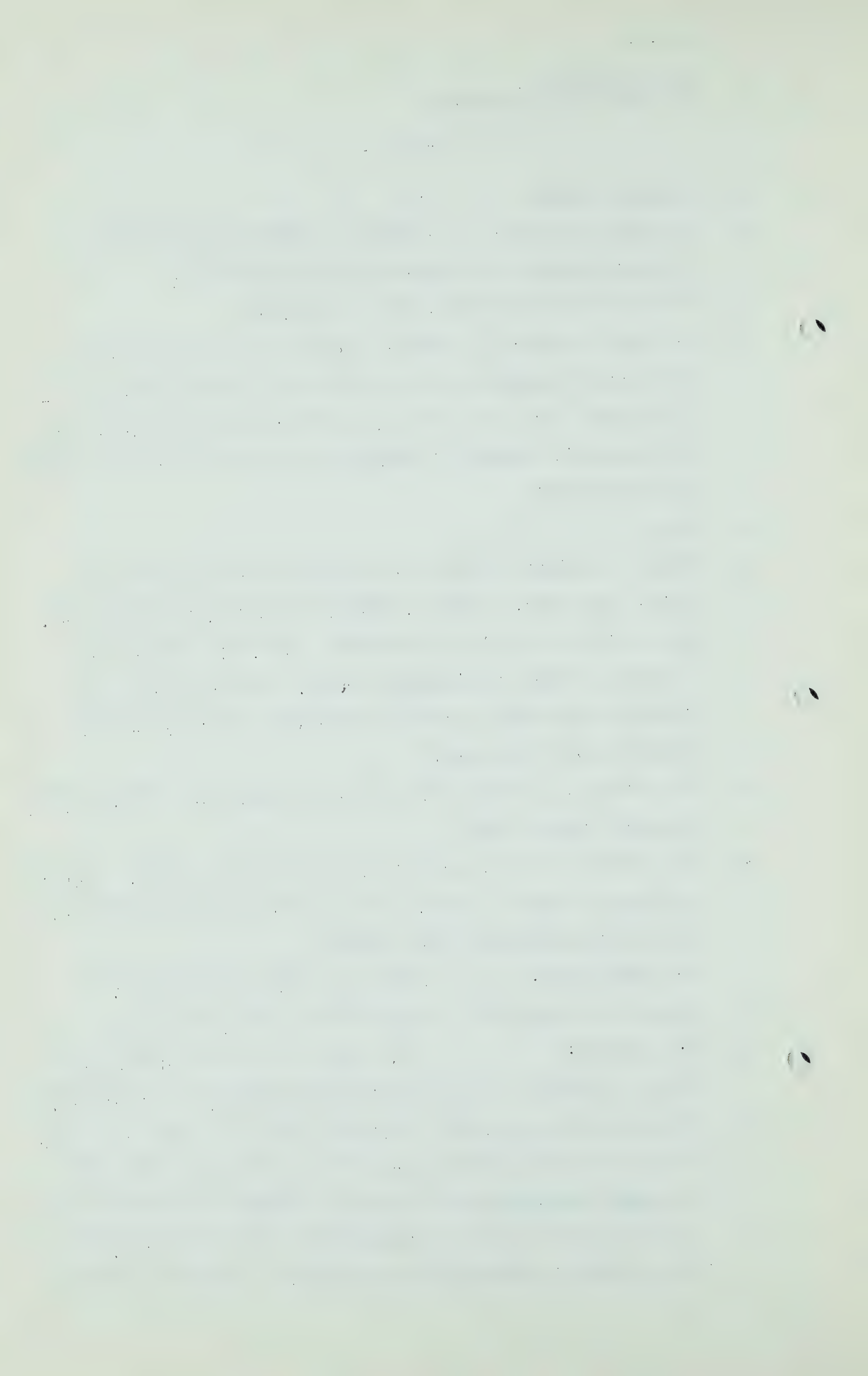
Q In arriving at that, what did you take into account? That is a judgment figure, I know, but if you could give us some idea of how you arrived at that figure?

MR. BRUCE SMITH: Where is that, in Appendix 2?

A Table 2, an appendix to our exhibit, gives 45.4.

Q MR. McDONALD: Yes, that is the lower right-hand figure in Table 2 of the Exhibit just filed by Mr. Davidson.

A On page 20 of our report we said, "With the advent of cheaper fuel there will be an acceleration in the use of gas per customer consequent upon the more widespread acceptance of gas for water heating, refrigeration and space heating." Yes. We have increased the average per customer from the



R. S. Davidson,  
Cr. Ex. by Mr. McDonald.

- 272 -

first full year of natural gas of 21.2 Mcf. to 45.4 Mcf.

Q Yes. Now the only reason I mentioned that, Mr. Davidson, is that on the submissions that have been received from various companies that have been filed in this application, or which we have had for the last few days, taking into account the larger cities only, I find Bellingham has an average of sales for domestic consumers in the 5th year 54.5, Seattle 50.7, Everett 44, Washougal 62 and Portland 64. Now do you quarrel with - in the light of these figures we could also look at the number of degree days in Mr. Copp's Exhibit No. 5. Vancouver has degree days, 5,118 compared to Seattle of 4,321, Tacoma 5,039 and Portland 4,353. In the light of those figures do you think an estimate of 52.3 for estimated sales per domestic consumer in the 5th year, made by Mr. Sample in his Exhibit 39 in his evidence, is a fairly reasonable estimate?

A I do not think it is a question of degree days, Mr. McDonald. It is a question of the ratio between space heating customers and your general use customers. We have estimated it through figuring on domestic customers we will obtain and the average use that they will take to that for space heating and general use and we have come up with a figure of 45.4. Other estimates could be made that would arrive at a higher number of space heating customers and would change that figure, but our estimates bring us to this 45.4.

Q Are the houses different? Is the average consumer - - is there anything else besides climate that affects the use of gas?

A Yes, the average use is affected by the ratio of ordinary general use customers and the space heating customers.





R. S. Davidson,  
Cr. Ex. by Mr. McDonald.

- 273 -

Q Yes, and if your saturation was the same in comparable towns then degree days would affect this figure?

A Yes.

Q But other factors enter into it?

A Yes, the ratio or proportion of the classification of your domestic customers.

Q Yes. Now you are dealing with the difference in the uses as between customers, Mr. Davidson when you just raised - and Mr. Smith also raised the point - your estimate of the number of domestic customers in the 5th year was according to the Table in your Table 5?

A Table 2.

Q Table 2 is 76,400 of which 15,000 are space heating?

A That is correct.

Q Now I notice that in the Portland area, which has a pretty comparable population, according to the population figures given by Mr. Copp - I think the comparison is 493,000 in the Vancouver area as compared to 478,000 in the Portland area.

MR. BRUCE SMITH: Which schedule are you reading from?

MR. McDONALD: Table A of Exhibit 5.

Q The number of space heating customers estimated by the Portland Gas Company is 72,768. Now have you any explanation why the people of Vancouver are not going to be interested in natural gas to something relative to a similar demand in the Portland area, for space heating purposes?

A I am not sure. Does this take in the whole operation of the Portland Gas Company?

Q Yes. I mean the 493,000 takes in the whole of the six counties, or the five counties, according to my reading of the exhibit.



R. S. Davidson,  
Cr. Ex. by Mr. McDonald.

- 274 -

A And they show - I would say - -

Q 72,768 customers, space heating customers, out of a total of 134,879, which is one-half of the customers, are roughly space heating in Portland against 20 per cent or 25 per cent space heating in Vancouver?

A And what is their base figure, where do they start, what proportion of their customers are now space heating at the present time?

Q I would have to look at the exhibit.

MR. C. E. SMITH: I cannot even find the place in the book, let alone the figures.

Q The point is we are starting out with space heating customers at zero, we might say. That is 800.

Q MR. McDONALD: Yes. There are a large number of space heating customers in Portland today?

A Yes, and we are starting off from scratch, you might say.

Q Then in five years do you expect to be somewhere comparable, when you have a comparable population?

A Well, we have not compared the figures. We have estimated what we would get. We moved up from approximately 800 to 15,000 customers in the 5th full year.

Q Well, just tell me, are the people of Vancouver going to want gas to space heat or do you think they will?

A I think so, yes.

Q At the end of the first year and then do you expect you will have to increase that 15,000?

A Yes.

Q Do you suppose it will be comparable to the 72,000 in Portland?

A I have not gone into those matters at all.

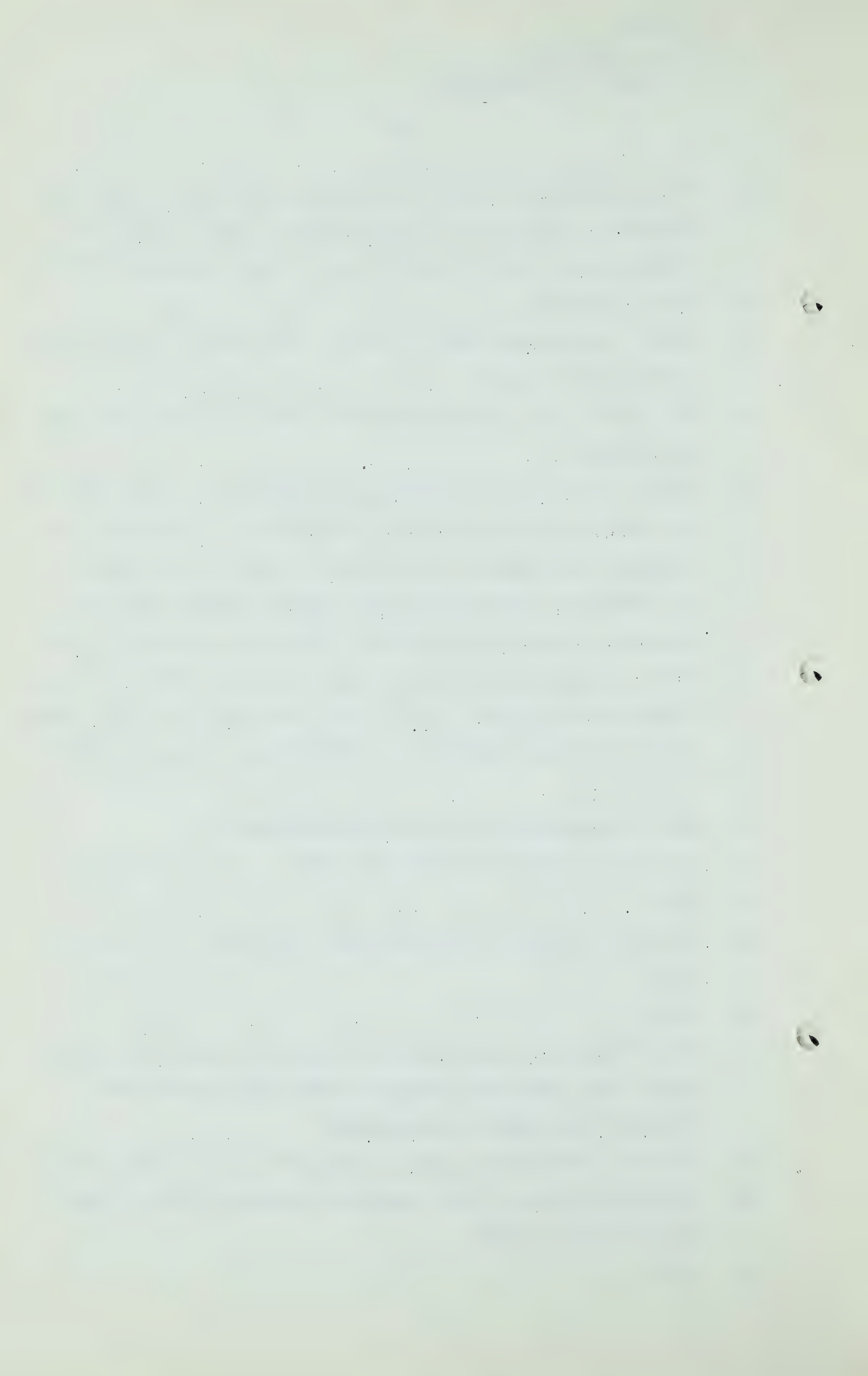




R. S. Davidson,  
Cr. Ex. by Mr. McDonald.

- 275 -

- Q Do you think the people in Portland, or I mean in Vancouver rather, are going to be content with a lower standard of living than in the Portland area, if they can avoid it?
- A Have they now?
- Q Well, I will just leave it there. You have not given thought past this 5th year?
- A No. That is the initial period of getting natural gas into the market.
- Q There was a further reference, Mr. Davidson, to the matter of a commercial rate, commercial consumption as contrasted to domestic consumption. In Exhibit 39 filed by Mr. Sample in the Westcoast application there was an increase over the estimates filed by yourself in this application and I would like to discuss that with you for a moment. Table 5 of your exhibit filed today, I note in the year 1950 Estimated Annual Sales, you have domestic at 1,665,000 and you have commercial  
--
- A Are we going back to the thousand BTU basis?
- Q No, we are going to discuss the 460.
- A Yes.
- Q You have 1,665,000 and commercial, and that is for 460 BTU gas?
- A Yes.
- Q So in the matter of selling of manufactured gas you have the same, your commercial customers practically equal your domestic customers in consumption?
- A That is 1,600,000 as against 1,060,000. It is almost even.
- Q It is 59 per cent, your commercial amounts to 59 per cent of your domestic sales?
- A Yes.



R. S. Davidson,  
Cr. Ex. by Mr. McDonald.

- 276 -

Q A ratio of 10 to 16?

A Yes.

Q Now at the end of your first year of 1,000 BTU natural gas your ratio is roughly 50 per cent?

A Yes, 12 to 6.

Q And then in 1956, in your 5th year, your ratio is down to approximately 25 per cent?

A That is right.

Q A trifle better?

A 34 to 8.8.

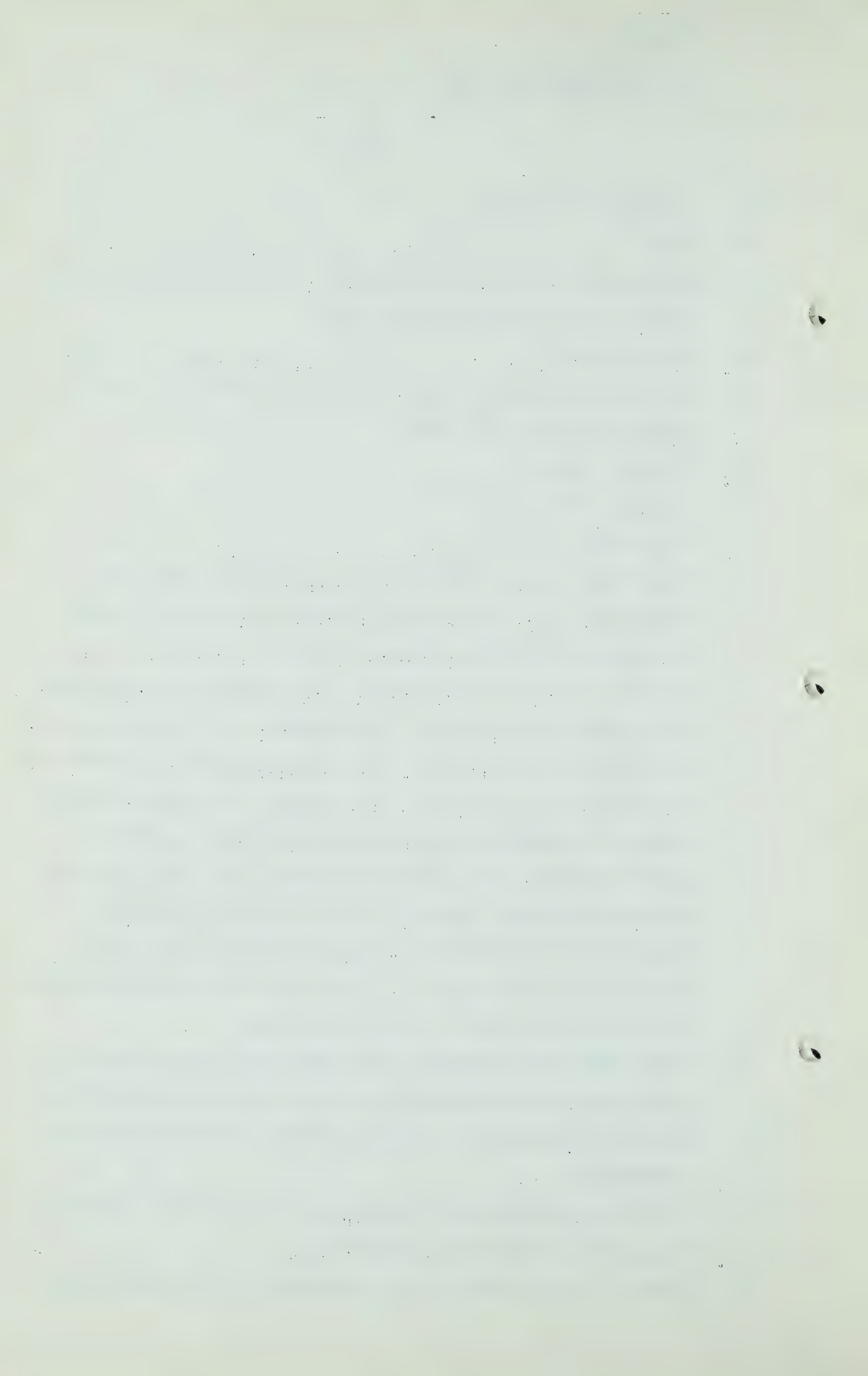
Q Yes. Have you an explanation as to why you have not anticipated more sales in the commercial in the 5th year as compared with your domestic increase?

A On page 21 of the brief which I have submitted we estimated the commercial use. "It is anticipated that the introduction of natural gas will have a less striking effect on commercial use than on domestic use. The company now enjoys a moderate amount of commercial space heating business in spite of prices that are much higher than fuel oils. This business has been obtained because of the collateral advantages of gas, such as cleanliness, lower installation cost, and saving of building space." Those were the collateral values we were talking about a little while ago.

Q Yes? What you have done is you have gone out and done a real job of salesmanship and you feel with your 464 BTU gas you have taken up the slack you would ordinarily have had otherwise?

A We have a fairly close contact with those people and there is a good job done there apparently.

Q Now you do anticipate as you increase your distribution of





R. S. Davidson,  
Cr. Ex. by Mr. McDonald.

- 277 -

domestic gas that you will also be able to add commercial customers?

A Oh, yes.

Q I mean apartment houses, hospitals and that type of thing will go on your line as you increase your distribution system?

A Oh, yes.

Q So it is a matter of judgment whether your figure of 25 per cent for your domestic in 1956 is a reasonable forecast or the figure used by Mr. Sample of 33-1/3 per cent in the fifth year?

A Yes, those are our estimates, Mr. McDonald. We feel that they are reasonable ones.

Q You do not quarrel particularly with the 33-1/3 per cent?

A They are all estimates.

Q Yes. The only thought I had in mind is that all the other companies who are selling in the same area that you are, we have Portland, 25. Portland, as you have already pointed out, has large domestic sales as compared to all the other areas?

A Space heating you mean?

Q Yes, space heating?

A Yes.

Q We have Seattle, 50 per cent and we have Tacoma, 43.7 per cent. We have Bellingham at 41 per cent.

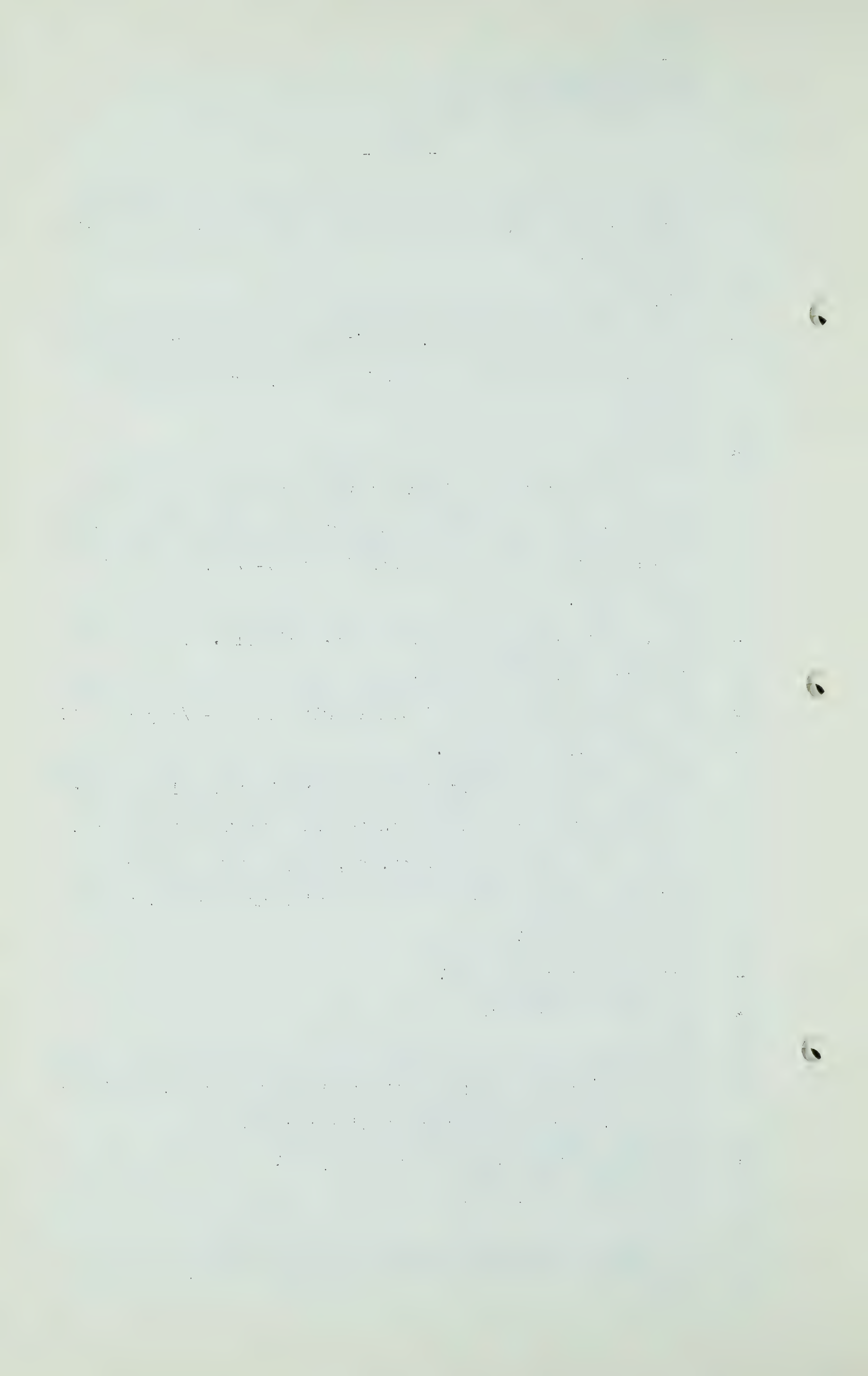
A You are talking about in the 5th year?

Q In the 5th year, yes?

A Yes.

Q As shown by the exhibits that have been filed?

A Yes.



R. S. Davidson,  
Cr. Ex. by Mr. McDonald.  
" " " Mr. S. B. Smith.

- 278 -

Q Or that have been delivered out to the parties. So the 33-1/3 per cent used by Ford, Bacon & Davis or Mr. Sample, is not unreasonable. It is a matter of judgment?

A Yes, I would say so.

MR. C. E. SMITH: Probably he hopes it is right, Mr. McDonald.

A These are our estimates, Mr. Smith.

Q You do not mind, though, if they get bigger and you sell some more?

A No, sir.

Q MR. McDONALD: The only thought I would draw to your attention is in your submission you end up with the conclusion, "It is believed that the estimates of consumption have been made on a most conservative basis. They might easily have been higher without being unduly optimistic."?

A That is correct.

Q And I have indicated some of the optimism that could have been applied?

A Yes.

Q MR. BRUCE SMITH: Mr. Davidson, when the Westcoast Company was presenting its evidence as to markets in British Columbia earlier in these hearings, were the figures you have given us in your brief today, were they made available to the Westcoast Company at that time?

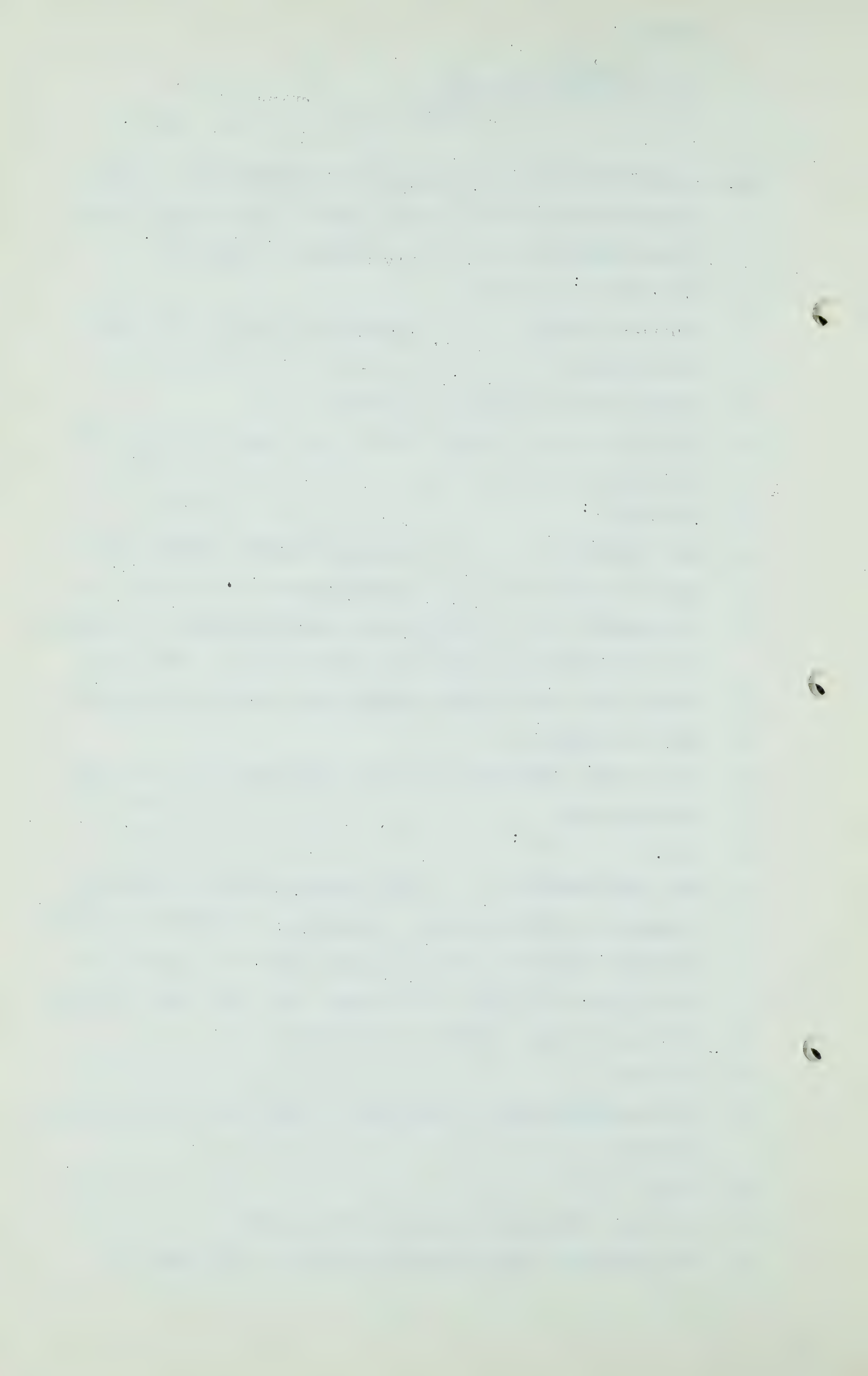
A Oh yes.

Q Your estimates now are the same as they were in the previous brief?

A Yes.

Q And were they made available to Westcoast?

A This estimate has been made available to all parties.





T-2-16

R. S. Davidson,  
Cr. Ex. by Mr. S. B. Smith.

- 279 -

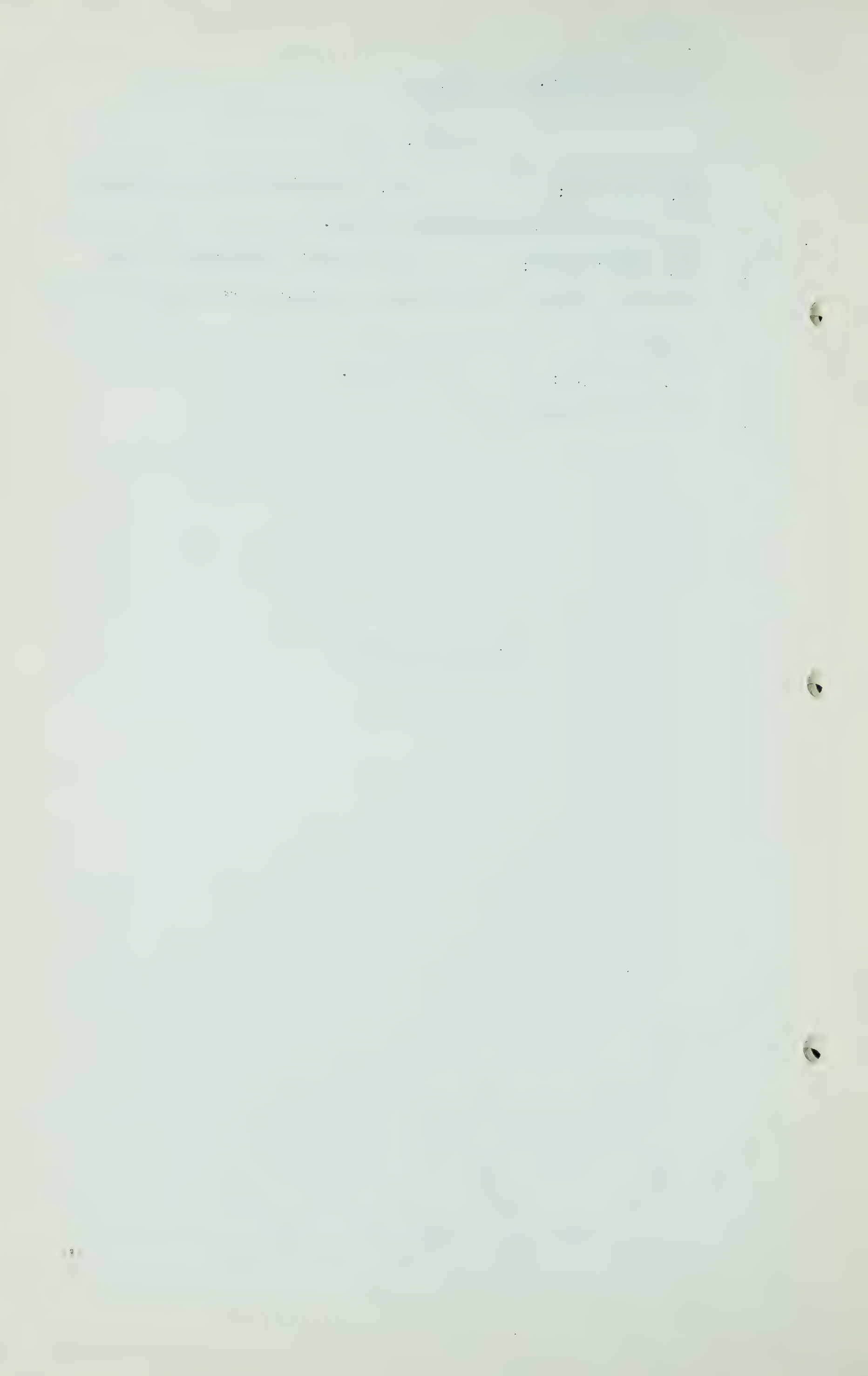
MR. McDONALD: Yes, I received them in January  
and the brief was presented later.

Q MR. BRUCE SMITH: They were in the hands of the  
Westcoast before the Westcoast estimates were given to this  
Commission?

MR. McDONALD: Oh yes.

A That is correct.

(Go to page 280 )



L. E. Jones,  
Dir. Ex. by Mr. Nolan.

- 280 -

MR. NOLAN: For the information of the Board  
and counsel, this is the Seattle Gas Company's brief.

LELAND E. JONES, having been first  
duly sworn, examined by Mr. Nolan, testified as follows:

Q Mr. Jones, you are connected with the Seattle Gas Company?

A Yes, sir.

Q In what capacity?

A I am the Assistant General Manager and my duties include rate  
and valuation work.

Q Are you an engineer by profession?

A Yes, sir.

Q You might just tell me something of your academic qualifica-  
tions.

A I graduated with a B.S. degree in civil engineering from  
Carnegie Institute of Technology, 1926, and since that time  
I have been continuously connected with the Gas Utility  
business.

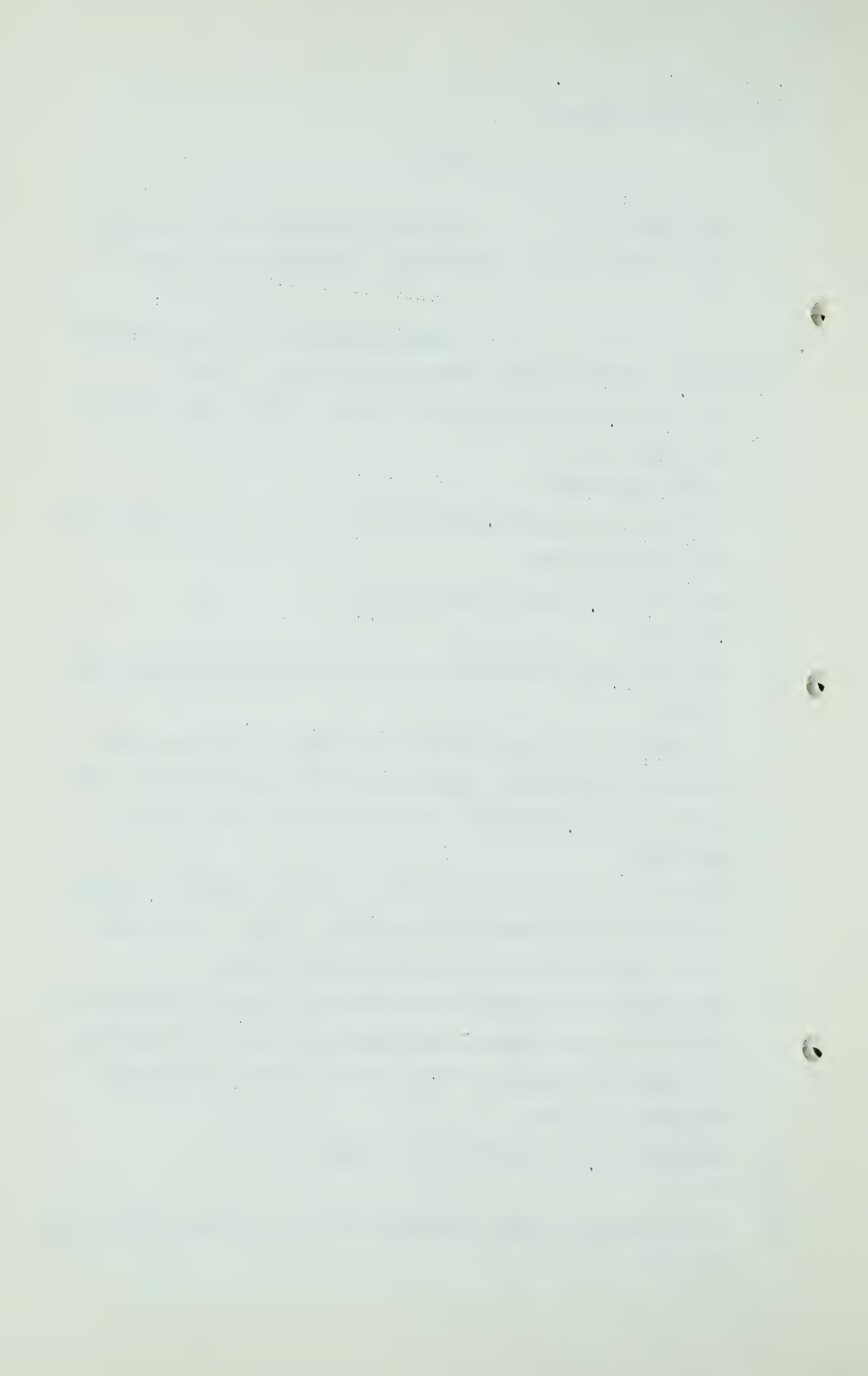
Q Yes, and you might just tell me in a word something of the  
operation of the Seattle Gas Company. There is something  
in the brief but just by word of introduction.

A The Seattle Gas Company manufactures gas for distribution in  
the Seattle area and we have by-products such as briquettes  
and light oil, things of that nature, which come from the  
manufacture of gas.

Q From what do you manufacture the gas?

A Oil.

Q Do you serve the area surrounding Seattle or just Metropolitan  
Seattle?





L. E. Jones,  
Dir. Ex. by Mr. Nolan.

- 281 -

A Metropolitan Seattle.

Q And the oil, where does it come from?

A California.

Q By tanker?

A Yes.

Q Who is the president of your company?

A Mr. N. Henry Gellert.

Q And he is here?

A Yes.

Q And I understand will make a statement during the course of  
his evidence on marketing?

A I understand so.

Q His statement will be general in its character?

A Yes, sir.

Q Now you have been requested by the present applicant to  
prepare a brief?

A Yes, sir.

Q You have done so?

A Yes, sir.

Q That is the document entitled "Seattle Gas Company"?

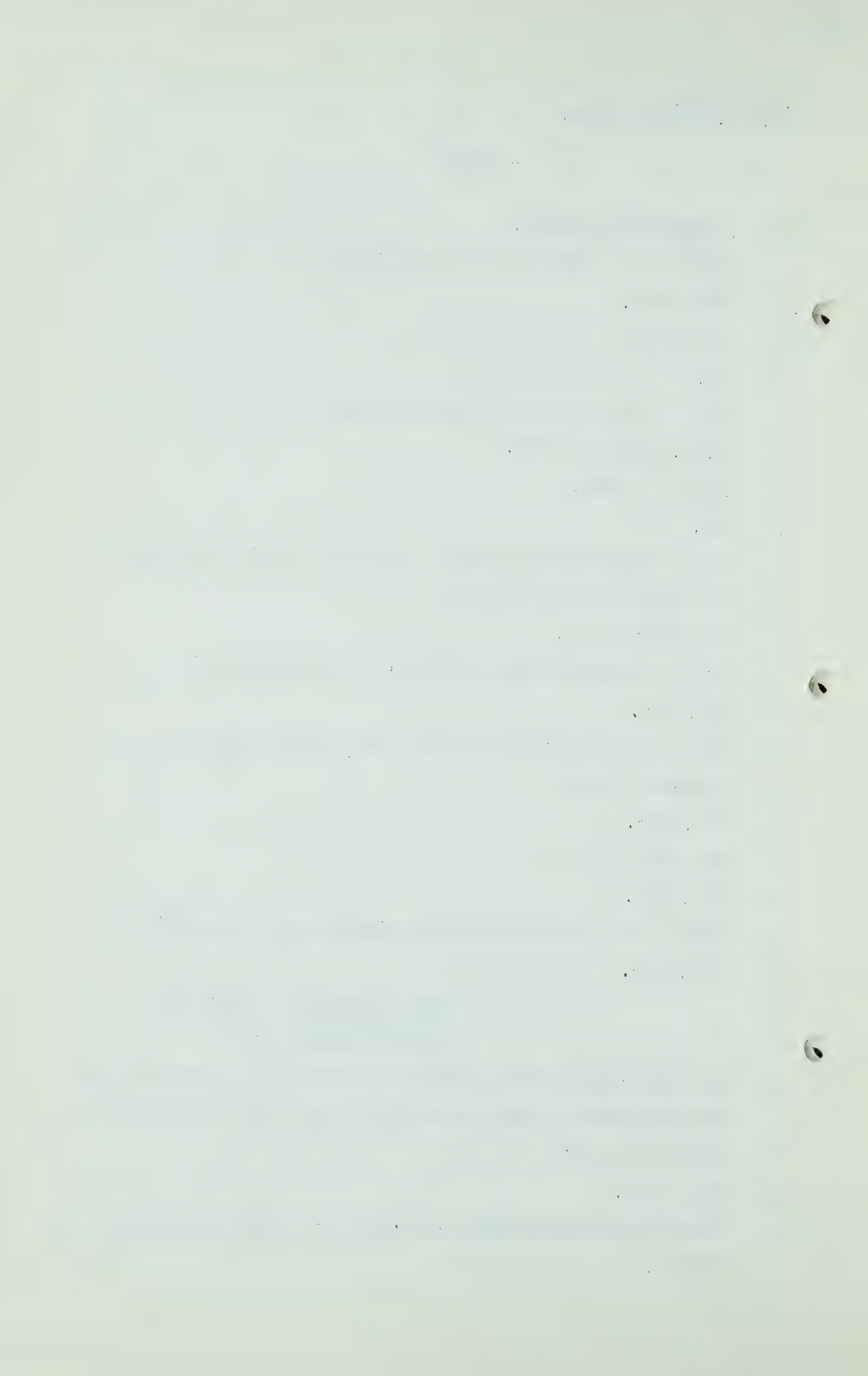
A Yes, sir.

BRIEF PREPARED BY SEATTLE  
GAS COMPANY PUT IN AND  
MARKED EXHIBIT 7.

Q And the result of the study and research that you have made  
is contained in this document which has just been marked as  
Exhibit No. 7?

A Yes, sir.

Q Would you be good enough, Mr. Jones, to read that to the  
Board?



L. E. Jones,  
Dir. Ex. by Mr. Nolan.

- 282 -

A Yes, sir. The purpose of this brief is to present data to the Conservation Board so that the Board may have before it the more important pertinent facts necessary to formulate an opinion regarding the soundness and economic justification of authorizing the export of natural gas to the Pacific Northwest cities of the United States and, in particular, to the Seattle Metropolitan Area.

The brief contains:

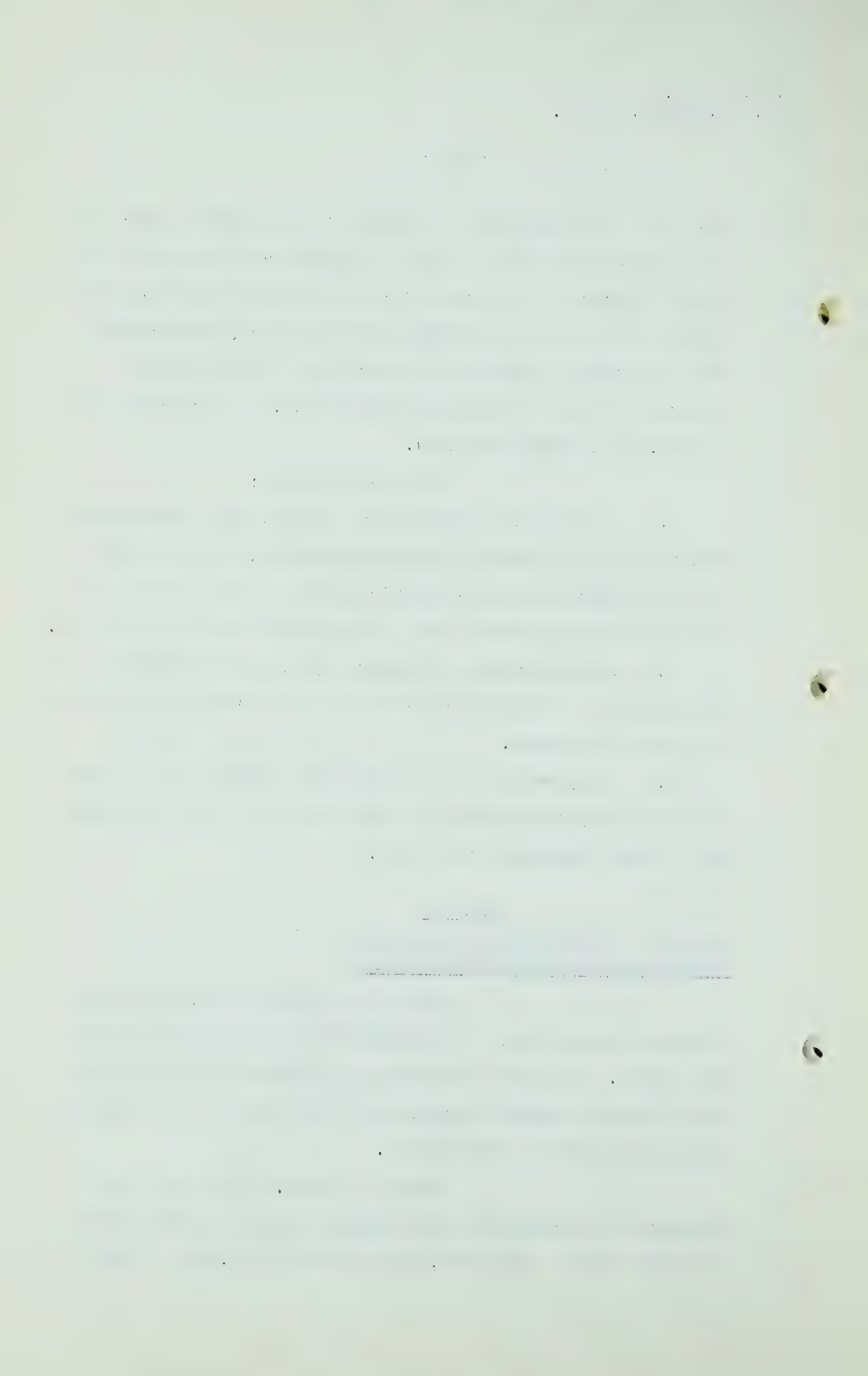
1. A statement regarding the economic and industrial background of the Seattle Metropolitan Area, dealing with the more important socio-economic aspects of the area to be considered in connection with the introduction of natural gas.
2. An explanation of present operations of Seattle Gas Company in the manufacture and distribution of gas in the area which it serves.
3. An appraisal of the market for natural gas in the Seattle Metropolitan Area for the first full year of natural gas and the following four years.

#### PART I

##### ECONOMIC AND INDUSTRIAL BACKGROUND OF THE SEATTLE METROPOLITAN AREA.

The State of Washington, according to latest statistics, is the third fastest growing state in the nation. Abundant resources and industrial opportunity have given thousands of people who have moved to the Pacific Northwest faith in their future.

Seattle's metropolitan area has increased in population approximately forty per cent during the past decade - from 452,639 in 1940 to 633,000 in 1949





L. E. Jones,  
Dir. Ex. by Mr. Nolan.

- 283 -

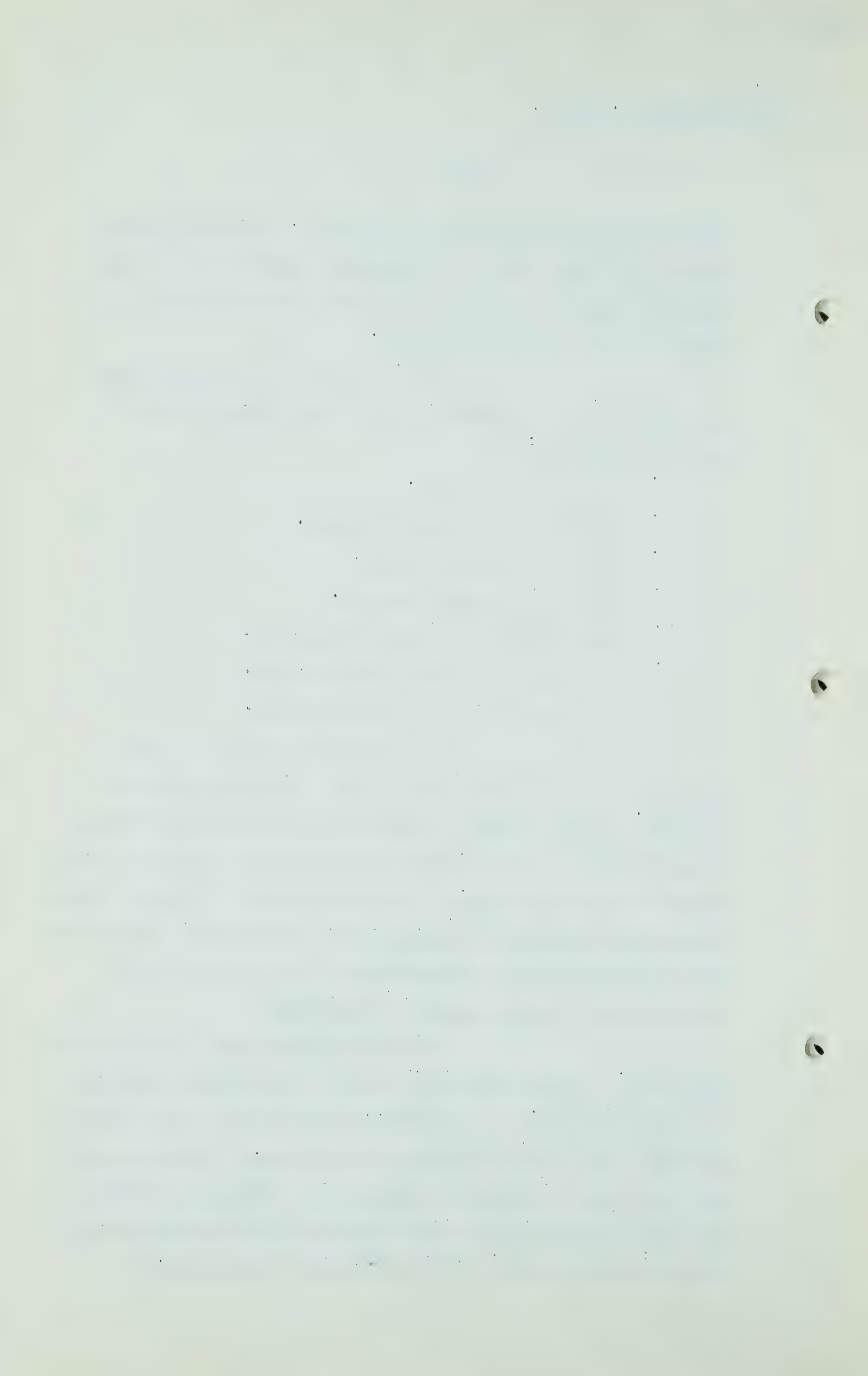
(based on State Census Board estimate). Seattle enjoys a position as focal hub in a tremendous trading area, encompassing slightly more than two-thirds of the State's population and purchasing power.

The following elements which make for economic and industrial success are abundant in the Pacific Northwest:

1. World-wide markets.
2. Productive and skilled labor.
3. Great natural resources.
4. Unexcelled transportation.
5. Ample space for further expansion.
6. High-grade and ample water supply.
7. A friendly and cooperative spirit.

Industrial development of the Seattle area is characterized by wide diversification of industry. This affords economic protection and stability of earning power to the 198,615 industrial plant workers in the Seattle King County area. The annual payroll of these workers during 1949 amounted to \$628,222,776. Of Seattle's more than 700 industrial plants, there are 213 that employ over 50 persons each in their specific operations.

Aircraft manufacturing, shipbuilding and repair, lumber and fisheries are the leaders in Seattle's list of industries. In addition, practically every type of manufacturing and processing is to be found. Ranking high on the list are the following industries: freezing, canning, or other utilization of agriculture and dairy products and seafoods; fabrication of light metals; leather goods;



L. E. Jones,  
Dir. Ex. by Mr. Nolan.

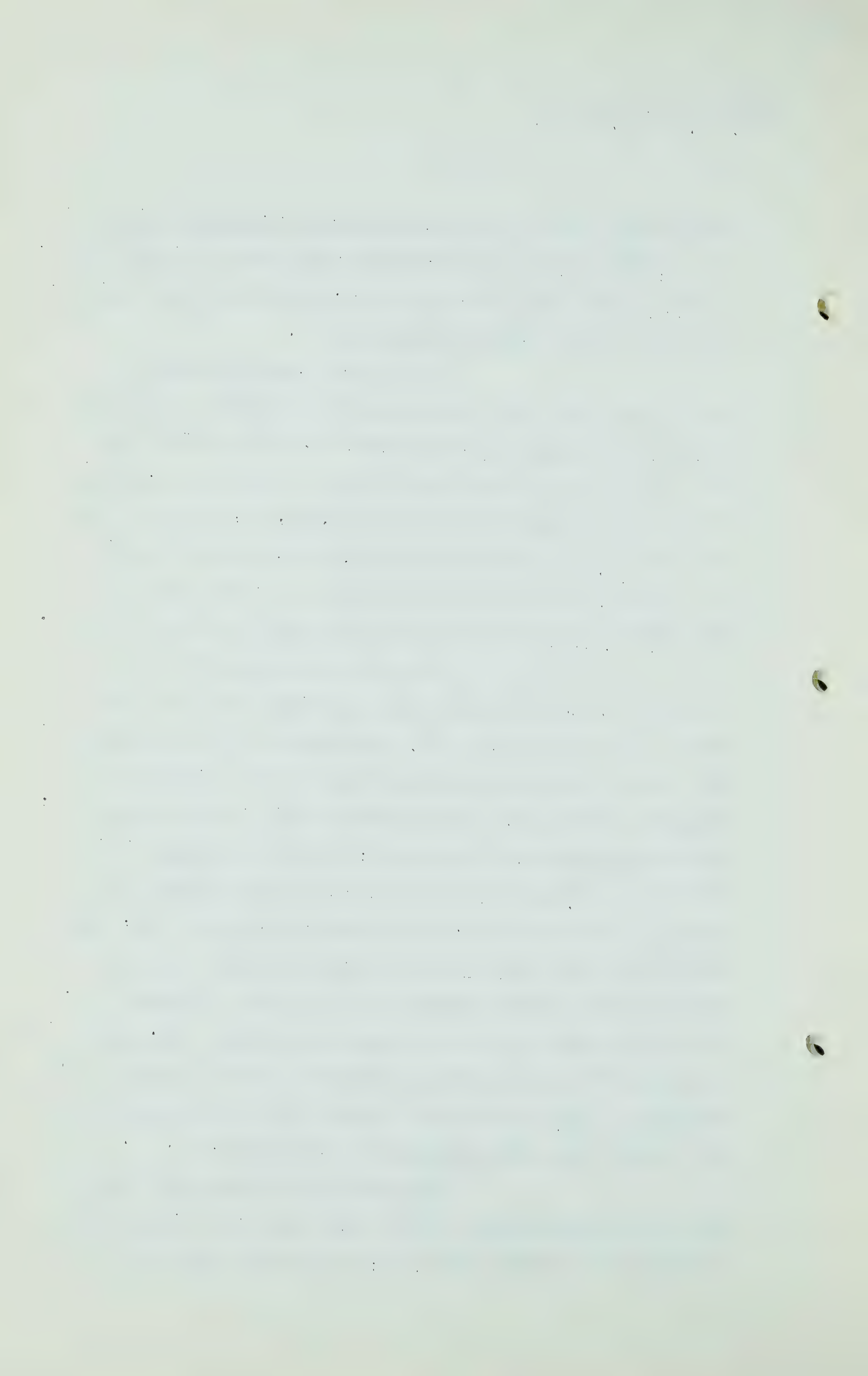
- 284 -

apparel manufacture; parts and machinery; chemicals; furniture; plywood; glass and ceramics; refrigerator railway cars, trucks, busses and farm machinery; pleasure craft and commercial small boats; paper products, etc.

During 1949, twenty-four new industrial plants went into operation in Seattle, opening up 245 new industrial jobs for workers. Old plant facilities were replaced by twenty-five new plant facilities, which involved capital expenditures of \$2,617,100, and opened up 52 new jobs. During the last year, also, there were seventy-four expansions of present industrial facilities involving \$12,402,095 in capital expenditure and adding 107 new jobs.

The growth and prosperity of Seattle's "hinterland" area is an important factor in the retail trade of the city. The trade area of Seattle department stores extends north along Puget Sound; northeast into Okanogan County; east and southeast to the Columbia River; south through Pacific County; and west to the Olympia Peninsula. Twenty counties, comprising approximately two-thirds of the State's population and buying power, fall into this trade area. All of the leading department stores in the city carry active accounts for customers in Alaska, Montana and Idaho, as well as Washington State. The rural economy of Washington plays an important part in Seattle retailing. Gross farm income for the State of Washington for the past year was approximately \$583,000,000.

Effective buying income for 1949 in Seattle was approximately \$2,000 per capita; for King County slightly more than \$1,700; and for the entire State of





L. E. Jones,  
Dir. Ex. by Mr. Nolan.

- 285 -

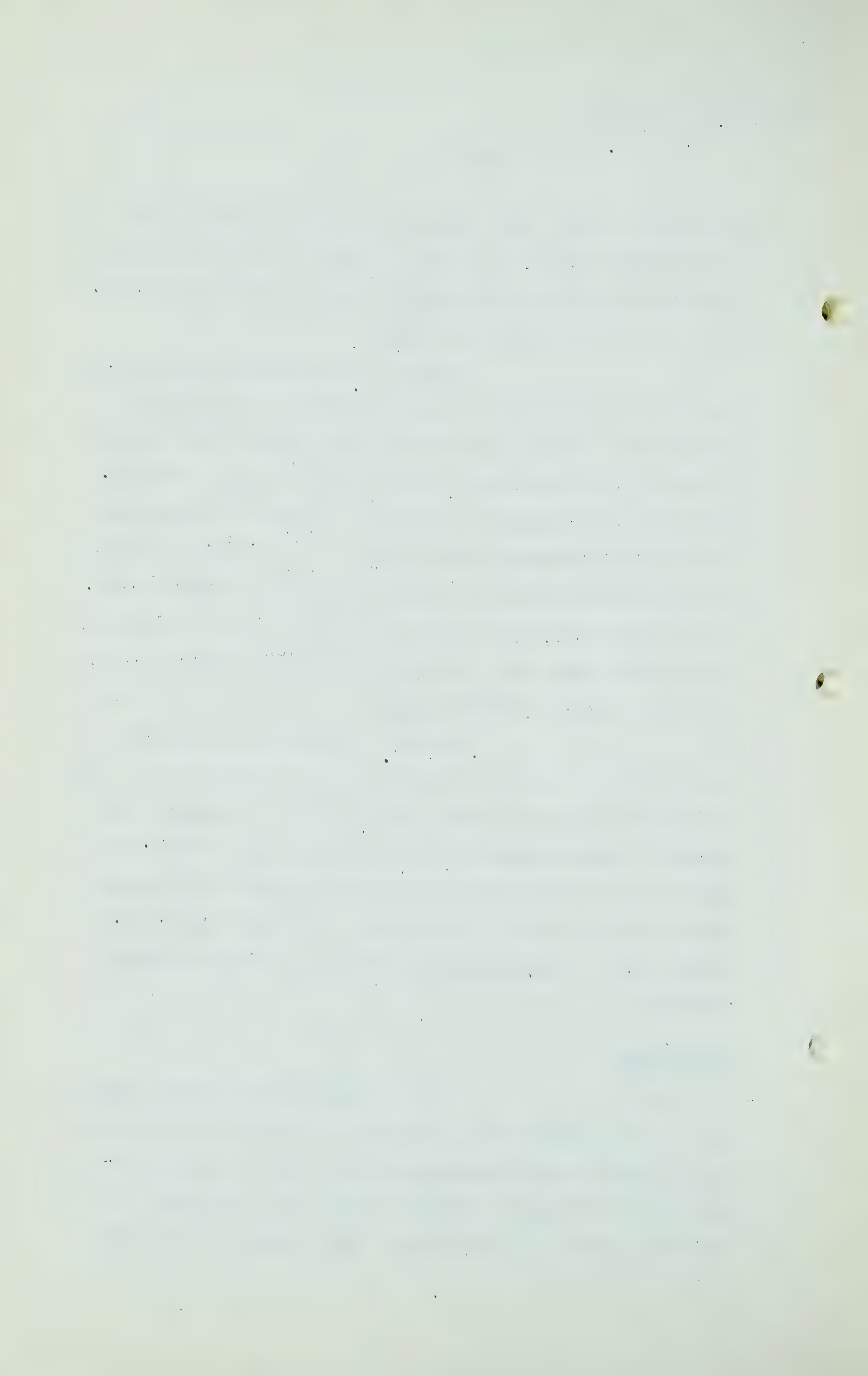
Washington \$1,400. The national average is about \$1,300. The per family effective buying income statistics for 1949 show Seattle families with \$5,700; this is more than \$1,200 above the national family average.

Growth of the Seattle Metropolitan Area also is evidenced by the high level of construction. During 1949, a total of 6,636 building permits were issued in Seattle, representing a value of \$53,741,845. In 1948, there were 6,652 permits issued for a value of \$54,461,930. Permits for residential construction in 1949 within the city limits numbered 1,755 for a total valuation of \$25,459,990; in the areas immediately north and south of the city limits proper there were 3,071 residential building permits issued for a total value of \$20,142,906.

Seattle is nearer to both Alaska and the Orient than any other major United States port. Last year, Seattle received \$123,600,000 worth of shipments from Alaska and made shipments to Alaska totaling \$116,800,000. Imports in foreign trade in 1949 totalled 239,942 tons and exports 324,190 tons. In addition, U.S. Army cargos added 48,323 tons of imports and 554,889 tons of exports during the year.

#### MANUFACTURE

Latest comprehensive figures available on the manufacturing industry of the State of Washington and the Seattle Metropolitan Area are the 1947 Census of Manufacturers Reports compiled by the U.S. Department of Commerce, Bureau of the Census. These figures show 3,410



L. E. Jones,  
Dir. Ex. by Mr. Nolan.

- 286 -

manufacturing establishments in the State (as of 1947) of which number there were 1,221 (35.8%) in the Seattle metropolitan area. Of the 144,324 manufacturing employees in the State, there were 54,770 (37.9%) in the Seattle area. The value added by manufacture for the Seattle area was \$265,422,000 (30.4%) of the total of \$874,036,000 for the State. Comparative figures for 1947 and previous years are shown in the following tabulations.

Q Now, Mr. Jones and I have discussed these tables, Mr. Chairman, and what we propose to do, with your permission, is simply highlight anything contained in them because reading them does not add very much. They are, as a matter of fact, aren't they, Mr. Jones, supporting evidence of the statements contained in the narrative itself?

A Yes.

Q Would you be good enough in your own way just to highlight anything contained in these tables that you think should be brought to the attention of the Board. This one you have before you now, just tell me what it is.

A It showed the number of establishments in the State in various years and the value added by manufacture to the products turned out by those establishments.

Q And the number of employees?

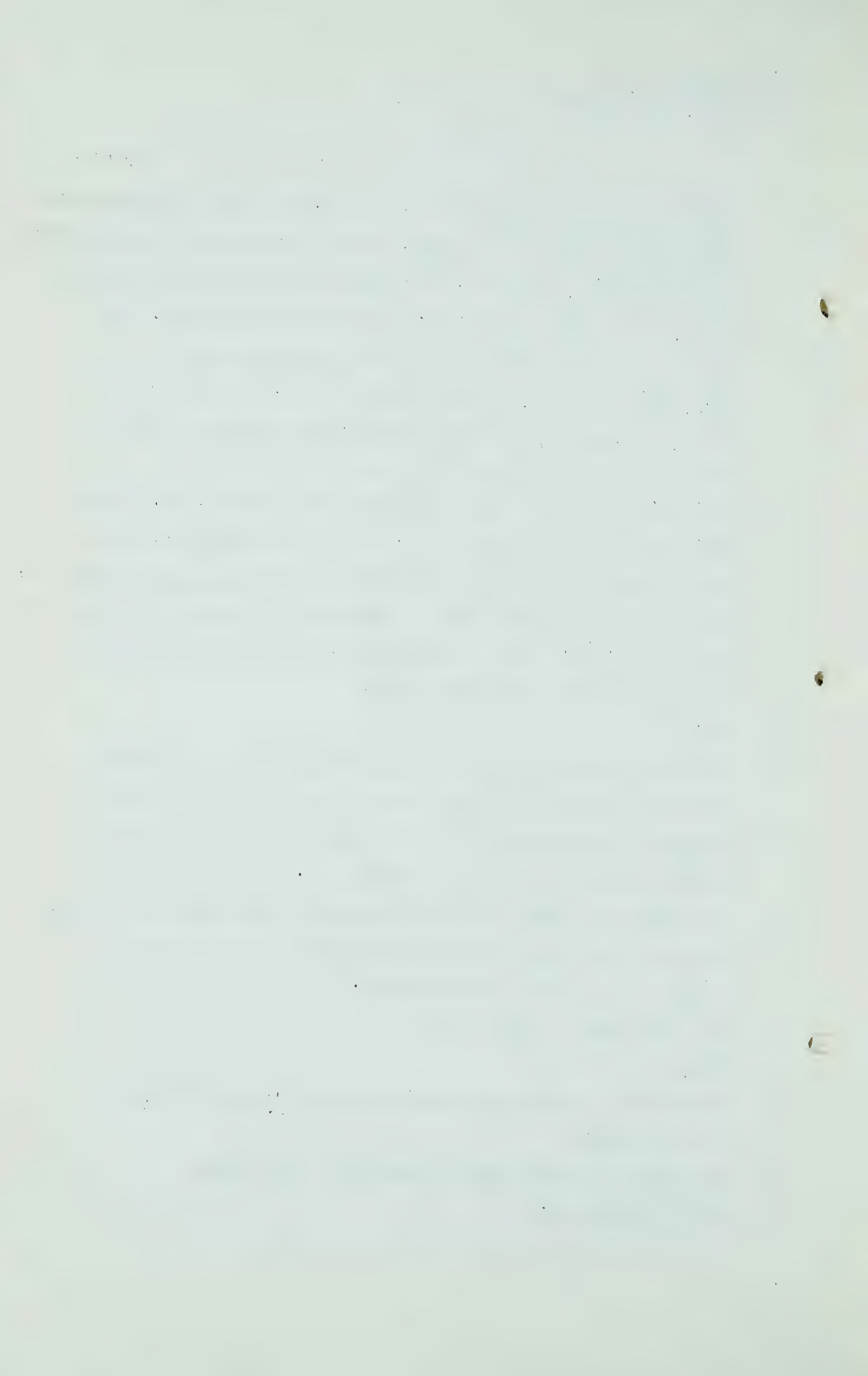
A Yes.

Q Showing the increase between the years 1919 and 1947?

A That is right.

Q And that is all you would like to say about that?

A Yes, I believe so.





L. E. Jones,  
Dir. Ex. by Mr. Nolan,

|             | <u>Number of Establishments</u> |                           | <u>Number of Employees</u> |                           | <u>Value added by Mfgr.</u> |                           |
|-------------|---------------------------------|---------------------------|----------------------------|---------------------------|-----------------------------|---------------------------|
|             | State of Washington             | Seattle Metropolitan Area | State of Washington        | Seattle Metropolitan Area | State of Washington         | Seattle Metropolitan Area |
| <u>Year</u> |                                 |                           |                            |                           |                             |                           |
| 1947        | 3,410                           | 1,221                     | 144,324                    | 54,770                    | \$874,036,000               | \$265,422,000             |
| 1939        | 2,858                           | 1,137                     | 99,119                     | 27,734                    | 267,716.000                 | 83,804,000                |
| 1929        | 3,672                           | 1,342                     | 128,740                    | 34,858                    | 367,149,000                 | 107,252,000               |
| 1919        | 4,356                           | 1,405                     | 144,331                    | N.A.                      | 361,907,000                 | 141,883,000               |

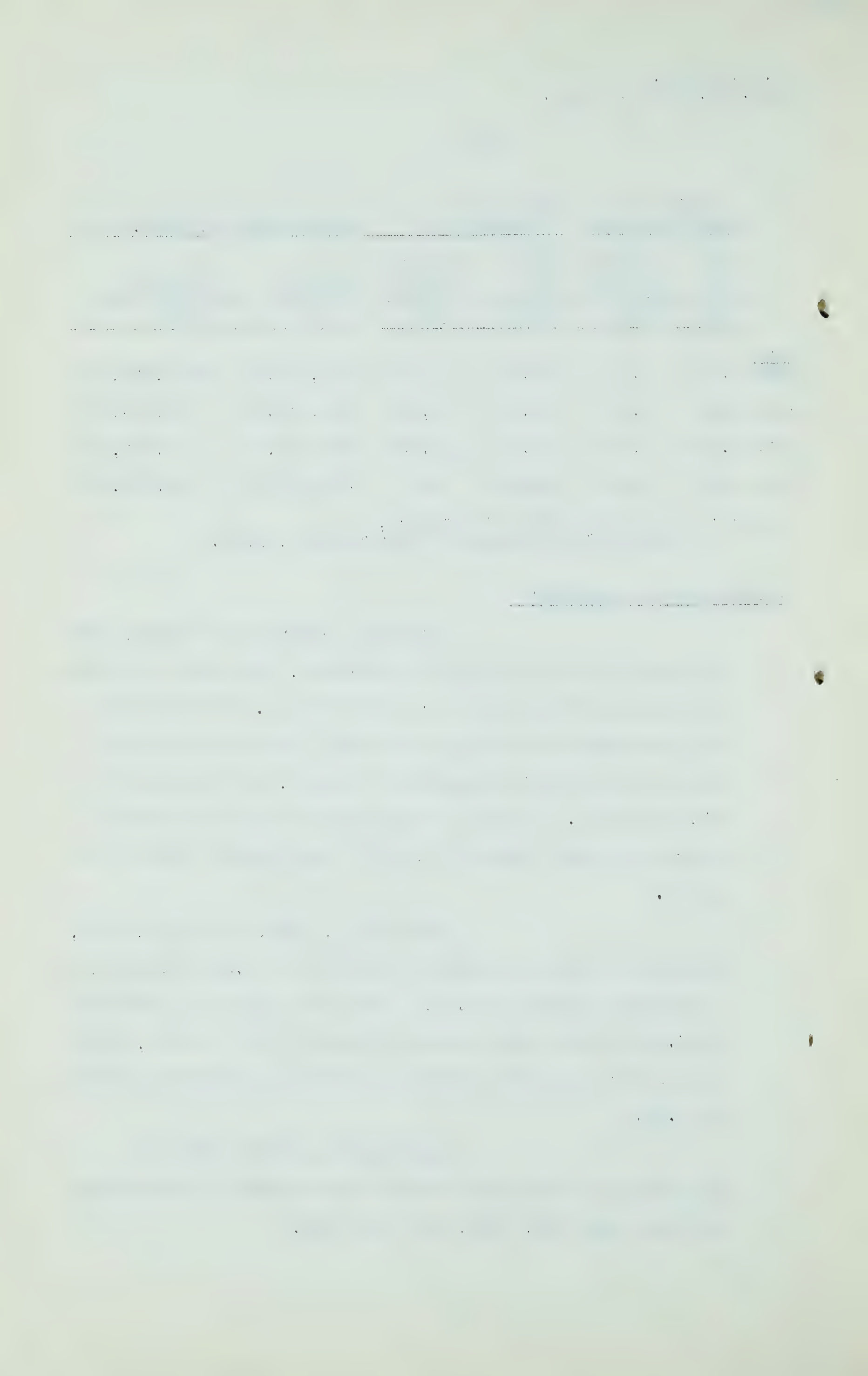
Source: U.S. Department of Commerce,  
Bureau of the Census of Manufactures, 1947.

POPULATION OF WASHINGTON

Favorable economic conditions, both nationally and in the Pacific Northwest, have affected population growth during and since World War II. Net migration into Washington from 1940 to 1947 was the most important cause of the state's population increase, accounting for 543,000 people. Second in importance was the accelerated natural increase (excess of births over deaths) during this period.

From July 1, 1947, to July 1, 1948, Washington showed a population increase of 5.5% compared with a national increase of 1.9%. There was a gain in population of 43.3% for the state during the period 1940 to 1948, while figures for the nation showed in the same period an increase of 11.0%.

The following table shows the population for the United States and the State of Washington for the years 1930, 1940, 1947 and 1948.



L. E. Jones,  
Dir. Ex. by Mr. Nolan.

- 288 -

That data is taken from the U.S. Department of Commerce, Bureau of the Census, showing population increase from 1930 to 1948 for the U.S., for the State of Washington, and the per cent which Washington is of the total.

| <u>Year</u> | <u>Population<br/>of<br/>United<br/>States</u> | <u>Population<br/>of<br/>Washington</u> | <u>Per cent<br/>of<br/>U.S. Total</u> |
|-------------|--|---|---------------------------------------|
| 1930        | 122,755,000                                    | 1,563,000                               | 1.27                                  |
| 1940        | 131,669,000                                    | 1,736,000                               | 1.32                                  |
| 1947        | 143,414,000                                    | 2,357,000                               | 1.64                                  |
| 1948        | 146,114,000                                    | 2,487,000                               | 1.70                                  |

Source: U.S. Department of Commerce,  
Bureau of the Census.

The percentage increase in population for the United States and for the State of Washington, respectively, are shown in the following table:

| <u>Percentage Increase in Population</u> |                      |                   |
|--|----------------------|-------------------|
| <u>Years</u>                             | <u>United States</u> | <u>Washington</u> |
| 1947 to 1948                             | 1.9%                 | 5.5%              |
| 1940 to 1948                             | 11.0%                | 43.3%             |
| 1930 to 1940                             | 7.2%                 | 11.1%             |
| 1930 to 1948                             | 19.0%                | 57.6%             |

Source: U.S. Department of Commerce,  
Bureau of the Census.

That shows that for the period 1930 to 1948 the population increase in the United States was 19% and in the State of Washington was 57.6%, and again the source of information is the U.S. Department of Commerce, Bureau of the Census.





L. E. Jones,  
Dir. Ex. by Mr. Nolan.

POPULATION OF SEATTLE METROPOLITAN AREA

It will be noted from the following table that the Seattle metropolitan area ranks thirteenth in the nation. It will also be noted that there was a 33.2% increase in population for this area during the period 1940 to 1947. This rate of growth was surpassed only in three other localities shown in the table.

Population of Selected Metropolitan Districts

| No. | Metropolitan District                  | Civilian Population April 1947 | Total Population April 1940 | Change from April 1940 to April 1947 |            |
|-----|--|--------------------------------|-----------------------------|--------------------------------------|------------|
|     |  |                                |                             | Number                               | Percentage |
| 1.  | New York -<br>Northeastern New Jersey, | 12,684,411                     | 11,690,520                  | 993,891                              | 8.5        |
| 2.  | Chicago                                | 4,644,640                      | 4,499,126                   | 145,514                              | 3.2        |
| 3.  | Los Angeles                            | 3,916,875                      | 2,904,596                   | 1,012,279                            | 34.9       |
| 4.  | Philadelphia                           | 3,372,690                      | 2,898,644                   | 474,046                              | 16.4       |
| 5.  | Detroit                                | 2,702,398                      | 2,295,867                   | 406,531                              | 17.7       |
| 6.  | Boston                                 | 2,549,700                      | 2,350,514                   | 199,186                              | 8.5        |
| 7.  | Pittsburgh                             | 2,100,092                      | 1,994,060                   | 106,032                              | 5.3        |
| 8.  | San Francisco-Oakland                  | 1,989,891                      | 1,428,525                   | 561,366                              | 39.3       |
| 9.  | St. Louis                              | 1,584,044                      | 1,367,977                   | 216,067                              | 15.8       |
| 10. | Baltimore                              | 1,306,040                      | 1,046,692                   | 259,348                              | 24.8       |
| 11. | Washington                             | 1,205,220                      | 907,816                     | 297,404                              | 32.8       |
| 12. | Minneapolis-St. Paul                   | 1,006,278                      | 911,077                     | 95,201                               | 10.4       |
| 13. | Seattle                                | 602,910                        | 452,639                     | 150,271                              | 33.2       |
| 14. | New Orleans                            | 601,608                        | 540,030                     | 61,578                               | 11.4       |
| 15. | Scranton-Wilkes Barre                  | 536,458                        | 629,581                     | -93,123                              | -14.8      |
| 16. | Portland                               | 534,422                        | 406,406                     | 128,016                              | 31.5       |
| 17. | Birmingham                             | 502,398                        | 407,851                     | 94,547                               | 23.2       |
| 18. | Atlanta                                | 498,109                        | 442,294                     | 55,815                               | 12.6       |
| 19. | Denver                                 | 471,460                        | 384,372                     | 87,088                               | 22.7       |
| 20. | Norfolk-Portsmouth-<br>Newport News,   | 471,034                        | 330,396                     | 140,638                              | 42.6       |
| 21. | Dallas                                 | 470,052                        | 376,548                     | 93,504                               | 24.8       |
| 22. | Rochester                              | 463,915                        | 411,970                     | 51,945                               | 12.6       |
| 23. | Columbus                               | 432,304                        | 365,796                     | 66,508                               | 18.2       |
| 24. | Akron                                  | 423,539                        | 349,706                     | 73,834                               | 21.1       |
| 25. | San Antonio                            | 417,010                        | 319,010                     | 98,000                               | 30.7       |



L. E. Jones,  
Dir. Ex. by Mr. Nolan.

- 290 -

Population of Selected Metropolitan Districts cont.

| No. | Metropolitan District       | Civilian Population April 1947 | Total Population April 1940 | Change from April 1940 to April 1947 |            |
|-----|-----------------------------|--------------------------------|-----------------------------|--------------------------------------|------------|
|     |                             |                                |                             | Number                               | Percentage |
| 26. | Memphis                     | 402,752                        | 332,477                     | 70,275                               | 21.1       |
| 27. | Toledo                      | 383,418                        | 341,663                     | 41,755                               | 12.2       |
| 28. | Youngstown                  | 380,897                        | 372,428                     | 8,469                                | 2.3        |
| 29. | New Haven                   | 352,036                        | 308,228                     | 43,808                               | 14.2       |
| 30. | Lowell-Lawrence-Haverhill,  | 347,820                        | 334,969                     | 12,851                               | 3.8        |
| 31. | Allentown-Bethlehem-Easton, | 337,683                        | 325,142                     | 12,541                               | 3.9        |
| 32. | Worcester,                  | 308,589                        | 306,194                     | 2,395                                | 0.8        |
| 33. | Salt Lake City              | 245,175                        | 204,488                     | 40,687                               | 19.9       |
| 34. | Tulsa                       | 213,276                        | 188,562                     | 24,714                               | 13.1       |

Source: Bureau of Census.

The table consists of a tabulation of population of selected metropolitan districts in the United States. There are 34 districts shown. It shows the population for each district in April 1940 and April 1947 with the number of increase and the percentage.

Q You might give us the figure for Seattle, if you please?

A Seattle is shown, population 1947, 602,910; for April 1940, 452,639; an increase of 150,271, with a percentage increase of 33.2.

LABOR FORCE

Continued net in migration to Washington and the natural increase during 1948 raised the available labor force of the state by 1.6% over 1947 to a total of 916,000 in January, 1949. Approximately one-third of the state's labor force is in King County, which is comprised principally of the Seattle Metropolitan Area. Reference is





L. E. Jones,  
Dir. Ex. by Mr. Nolan.

- 291 -

made to the following table which shows the total labor force for the State of Washington and for King County, respectively, for the years 1940, 1948 and 1949.

| <u>Total Labor Force</u> |                            |                        |                                |
|--------------------------|----------------------------|------------------------|--------------------------------|
| <u>Date</u>              | <u>State of Washington</u> | <u>King County (1)</u> | <u>Per cent of State Total</u> |
| March 1940 (2)           | 729,000                    | 225,600                | 30.9%                          |
| January 1948 (3)         | 902,000                    | 301,600                | 33.4%                          |
| January 1949 (3)         | 916,000                    | 299,900                | 32.7%                          |

Note: (1) Figures for Seattle Metropolitan Area, alone, are not available, but the data for King County are comprised principally of the Seattle Metropolitan Area.

(2) Source: Bureau of the Census.

(3) Source: State of Washington Employment Security Department.

This shows that the per cent of the total labor force in the State is from 31 to about 33.4 per cent located in King County.

#### HOUSING AND CONSTRUCTION

The number of dwelling units in the Seattle Metropolitan District, according to a survey made by the Bureau of the Census in April, 1947, has increased about 38,000 since 1940. There was a total of 202,092 ordinary dwelling units in the Seattle Metropolitan District in April 1947, compared with 164,295 in April, 1940. This is an increase of 23%. Population growth, during this period, as previously noted, was slightly over 33%. Therefore, it seems reasonable to expect housing construction to continue at a high level to catch up with, and keep pace with, the population increase.



L. E. Jones,  
Dir. Ex. by Mr. Nolan.

Dwelling Units in Seattle Metropolitan District

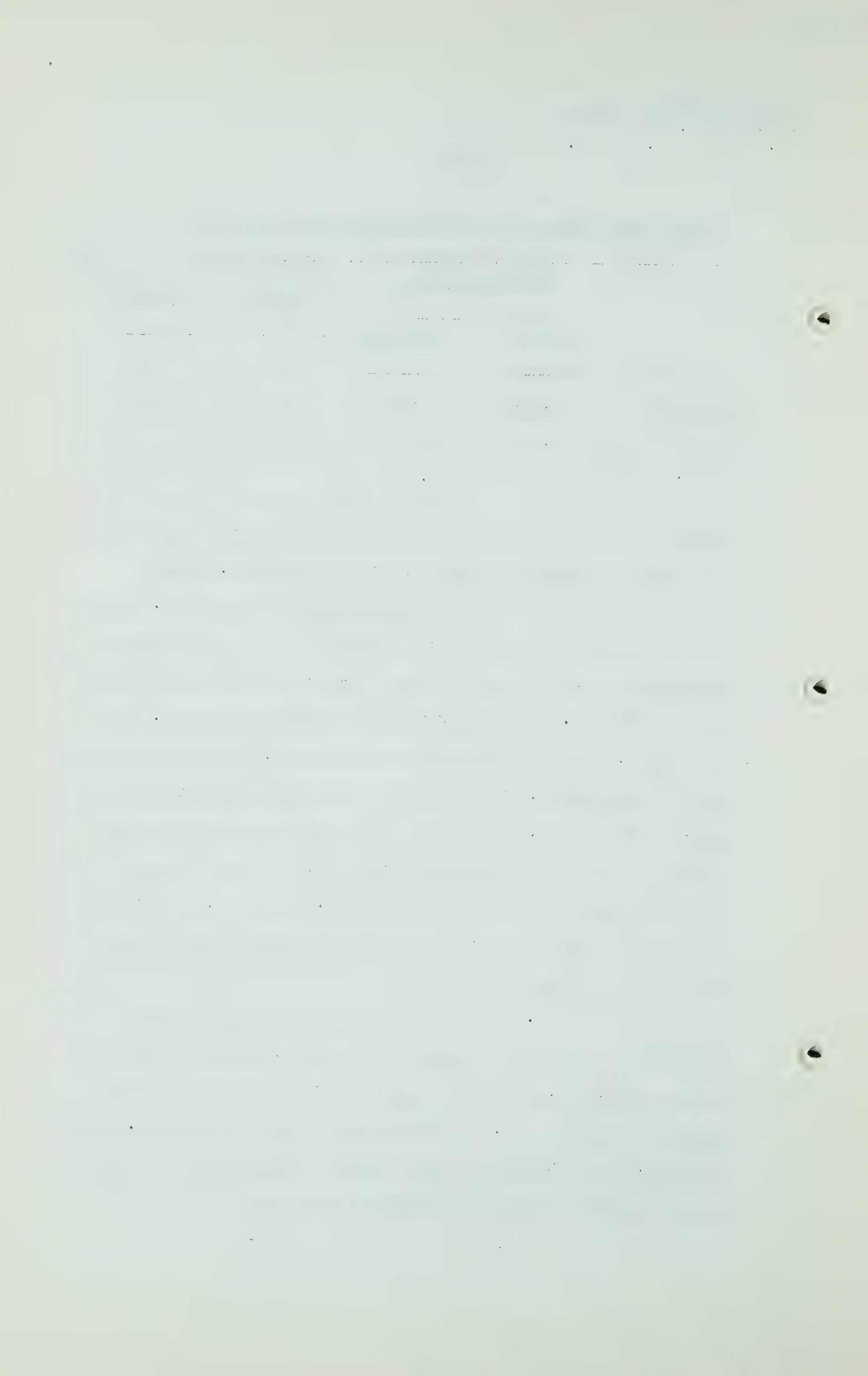
|            | <u>Total Ordinary Dwelling Units</u> |                   | <u>Occupied Owner Occupied</u> | <u>Dwelling Units Tenant Occupied</u> |
|------------|--------------------------------------|-------------------|--------------------------------|---------------------------------------|
|            | <u>Number</u>                        | <u>% Increase</u> |                                |                                       |
| April 1940 | 164,295                              | -                 | 50%                            | 50%                                   |
| April 1947 | 202,092                              | 23%               | 62%                            | 38%                                   |

Source: Bureau of the Census.

There is then shown a Table of Dwelling Units in the Seattle Metropolitan Area, and the following discussion brings out the information there.

In considering the potential market for natural gas, the extent of owner-occupied dwellings is an important factor. Seattle ranks high in this respect. In April, 1947, homes occupied by their owners, as shown in the foregoing table, represented 62% of all ordinary dwelling units. Furthermore, the trend of owner-occupied homes in the Seattle area has been upward since 1940, in spite of overcrowding during and after World War II. In 1940, owner-occupied dwelling units comprised 50% of the total compared with 62% in 1947. Tenant occupancy decreased from 50% in 1940 to 38% in 1947.

Owner-occupancy in the Seattle Metropolitan Area, as compared with such occupancy in other metropolitan districts, is shown in the following table. From this, it is noted that the median for ten other metropolitan areas surveyed in April 1947 by the Bureau of the Census was 53% compared with 62% for Seattle.





L. E. Jones,  
Dir. Ex. by Mr. Nolan.

- 293 -

Dwelling Units by Occupancy for Various  
Metropolitan Districts, April 1947

| <u>Metropolitan District</u>   | <u>Per Cent<br/>Owner<br/>Occupied</u> | <u>Per Cent<br/>Tenant<br/>Occupied</u> |
|--------------------------------|--|---|
| 1. Akron, Ohio                 | 69                                     | 31                                      |
| 2. Atlanta, Ga.                | 49                                     | 51                                      |
| 3. Baltimore, Md.              | 51                                     | 49                                      |
| 4. Birmingham, Ala.            | 49                                     | 51                                      |
| 5. Columbus, Ohio              | 52                                     | 48                                      |
| 6. Dallas, Texas               | 56                                     | 44                                      |
| 7. Denver, Colo.               | 53                                     | 47                                      |
| 8. Minneapolis-St. Paul, Minn. | 59                                     | 41                                      |
| 9. New Orleans, La.            | 33                                     | 67                                      |
| 10. Portland, Ore.             | 63                                     | 37                                      |
| Median                         | 53                                     | 47                                      |
| Seattle, Wash.                 | 62                                     | 38                                      |

There are 10 metropolitan districts shown in the table and a median compared with Seattle.

The trend of private urban residential construction in the State of Washington as compared with the national total is shown in the following table. This shows an increase over 1939 of 543.0% for the state as compared with 241.7% for the nation.

New Private Urban Residential Construction Activity

| <u>Year</u> | <u>U.S.<br/>Total</u> |                  | <u>State of<br/>Washington</u> |                  |
|-------------|-----------------------|------------------|--------------------------------|------------------|
|             | <u>\$Millions</u>     | <u>% of 1939</u> | <u>\$Millions</u>              | <u>% of 1939</u> |
| 1948        | 7,223.0               | 341.7            | 160.1                          | 643.0            |
| 1947        | 5,260.0               | 248.8            | 124.8                          | 501.2            |
| 1946        | 3,183.0               | 150.6            | 77.0                           | 309.2            |
| 1945        | 684.0                 | 32.4             | 21.7                           | 87.1             |
| 1944        | 535.0                 | 25.3             | 21.8                           | 87.6             |
| 1943        | 650.0                 | 30.8             | 26.6                           | 106.8            |
| 1942        | 1,315.0               | 62.2             | 27.8                           | 111.6            |
| 1941        | 2,765.0               | 130.6            | 53.0                           | 212.9            |
| 1940        | 2,355.0               | 111.4            | 42.2                           | 169.5            |
| 1939        | 2,114.0               | 100.0            | 24.9                           | 100.0            |

The foregoing figures are not adjusted to compensate for effect of price increases.

Source: U.S. Department of Commerce,  
Bureau of Foreign and Domestic Commerce.



L. E. Jones,  
Dir. Ex. by Mr. Nolan.

- 294 -

And then is listed a table showing new private urban residential construction activity in the United States as compared with the State of Washington.

ELECTRIC POWER

While Bonneville and Coulee furnish low-cost power to the Pacific Northwest, the use of electricity for thermal purposes has been promoted to such an extent that electric power for the mechanical and electro-chemical processes of new industries is unavailable.

That this power shortage is recognized by the electric utilities is evidenced by the following excerpt from the Annual Report for 1949 issued by the Puget Sound Power and Light Company. This is the quote from that report:

"Recognizing the critical power situation prevailing in the Pacific Northwest, the Washington Public Service Commission held hearings with regard to conservation measures during 1948 and 1949. Subsequently, the Commission on October 14, 1949, issued an order establishing restrictions on new electrical loads which in part reads as follows:

'That the Puget Sound Power & Light Company, The Washington Water Power Company, Pacific Power & Light Company, and all other electric utilities companies subject to the jurisdiction of this Commission and each of them should be required to file with the Commission a restrictive tariff schedule which provides (1) that no new or additional electric service will be supplied for space





L. E. Jones,  
Dir. Ex. by Mr. Nolan.

- 295 -

heating purposes, and (2) that no new or additional industrial power loads of 500 kilowatts or more of demand will be supplied, except where essential to the public health, public safety, national security, or where definite commitment to service has been made by the company prior to the effective date of the schedule, said schedule to be effective upon receipt and approval by the Commission and to remain in effect until April 1, 1950, unless otherwise ordered by the Commission, and that the burden of proof with respect to the continued application of these restrictions after April 1, 1950, shall be upon the petitioners herein.'

"In compliance with this order, the Company filed the necessary tariffs effective October 20, 1949, and, based on the present expectation that an adequate power supply will not be available to the Company until at least 1954, it is anticipated that a continuance of these restrictions will be necessary.

"From data presently available it is estimated that the combined peak load of the western portion of the Northwest Power Pool will be around 4,200,000 kilowatts by the end of 1951 - an increase of approximately 700,000 kilowatts, or 20%. During this same period, six additional units will be installed at Grand Coulee, adding 720,000 kilowatts to the present reported capacity of 1,440,000 kilowatts. Unless and until increased upstream storage is provided, such additional installed capacity at Grand Coulee will not be available continuously during the winter period of high power consumption, since the normal flow of water in the Columbia River during this period is



L. E. Jones,  
Dir. Ex. by Mr. Nolan..

- 296 -

sufficient to operate only about nine units continuously without withdrawal from storage. Consequently, while there would appear to be sufficient peaking or short-duration capacity available for the area as a result of the installation of these additional units, it is anticipated that there will be a substantial energy or long-duration capacity deficiency. The extent of such energy deficiency will vary with water conditions and, in the event of critical water, a substantial curtailment in the use of electricity would be necessary. Such curtailment would have a serious effect upon the economy and well-being of the area. It is presently estimated that the deficiency in generating capacity will continue until at least 1954."

That ends the quotation from Puget Sound Light & Power report. Now, continuing with our own report.

The estimates of the capacity of the proposed natural gas pipeline from Alberta indicate that the kilowatt equivalent of the gas which can be delivered yearly to the Pacific Northwest is as great as the present power output of both Coulee and Bonneville.

By relieving the electric power pool of the thermal load it is now carrying, or a large portion of it, electric power will become available for mechanical and electrochemical purposes in a sufficient amount to encourage the coming of new industries into the Pacific Northwest.





L. E. Jones,  
Dir. Ex. by Mr. Nolan.

FUEL CONSUMPTION IN WASHINGTON

The fuel picture in the State of Washington has been altered considerably since the pre-war years of 1939 and 1940. The most striking change has been the tremendous increase in the total amount of fuel consumed in the area. A general expansion and diversification of industry plus the rapid growth in the total population of the state during this period has been the chief factor in bringing about this increase.

The following table shows an increase of 115% in total fuel consumption in the state during the period 1939 to 1948, from 113.6 trillion BTU's to 244.5 trillion BTU's. The declining importance of coal, indicating the trend toward fuel more suitable for automatic heating is a noteworthy observation.

Calorific Value of Coal, Oil, Gas and Electricity  
Consumed in Washington 1939, 1944 and 1948

|                     | 1939               |               | 1944               |               | 1948               |               |
|---------------------|--------------------|---------------|--------------------|---------------|--------------------|---------------|
|                     | BTU<br>(Trillions) | % of<br>Total | BTU<br>(Trillions) | % of<br>Total | BTU<br>(Trillions) | % of<br>Total |
| Coal                | 46.2               | 40.7          | 81.4               | 34.9          | 57.5               | 23.6          |
| Fuel Oil            | 56.6               | 49.8          | 116.2              | 49.9          | 149.5              | 61.1          |
| Manufactured<br>Gas | 1.8                | 1.6           | 2.7                | 1.2           | 3.4                | 1.4           |
| Electricity         | 9.0                | 7.9           | 32.5               | 14.0          | 34.1               | 13.9          |
| Total -             | 113.6              | 100.0         | 232.8              | 100.0         | 244.5              | 100.0         |

Source: Fuel Trends in Washington, Economic and  
Business Studies, Bulletin No. 11, The  
State College of Washington.

And the table then shows a comparison for the years 1939, 1944 and 1948 of fuel consumption in the form of coal, fuel oil, manufactured gas and electricity.



L. E. Jones,  
Dir. Ex. by Mr. Nolan.

- 298 -

Q The point you were making, Mr. Jones, is that coal has gone down from 40.7 in 1939 to 23.6 in 1948?

A That is right.

Q There has been an increase in the use of fuel oil, there has been a slight decrease in the use of manufactured gas, and the use of electricity has about doubled.

A Percentage-wise, that is.

Q Yes?

A Gas shows a decrease percentage-wise but almost a doubling in quantity. Reliable data on fuel consumption for the Seattle Metropolitan Area is not available. However, it is a reasonable deduction that the trends indicated for the state in the foregoing table are applicable for the Seattle district. This presumption is substantiated by a consumers' survey made by the Seattle Times in 1948 of the Greater Seattle Market Area which disclosed that 68.5% of the homes are heated by oil. The next closest competitor for the home fuel market was coal and wood at 28.2% of total heating installations. Reference is made to the following table:

Types of Home Heating in Greater Seattle (1)

| <u>Type of Heating</u> | <u>Total (2)</u> |               |
|------------------------|------------------|---------------|
|                        | <u>Per Cent</u>  | <u>Number</u> |
| Oil                    | 68.5             | 117,551       |
| Coal and wood          | 28.2             | 48,427        |
| Gas                    | 3.6              | 6,246         |
| Electricity            | 1.5              | 2,643         |
| Other                  | <del>AA</del>    | 34            |
| Don't know             | 1.4              | 2,334         |

Notes: (1) Source: 1948 Consumer Analysis of the Greater Seattle Market, compiled and published by the Seattle Times.

(2) Totals more than 100% as some families use more than one type of fuel.

~~AA~~ Less than .1%.





L. E. Jones,  
Dir. Ex. by Mr. Nolan.

- 299 -

Reference is made to the following table which shows the types of home heating in the Greater Seattle Area and the per cent number using the different types of fuel, using oil 58.5, and using the same type of figures for coal, wood, gas, electricity and other things which are not known.

(Go to page 300 )



L.E. Jones,  
Dir. Ex. by Mr. Nolan

- 300 -

The utilization of manufactured gas for heating purposes in the Seattle area has increased 141.0% volume-wise since 1939. The number of customers has increased 123.5%. In the following table is shown the development of the gas heating load of Seattle Gas Company during the past eleven years:

Development of Gas Heating Business  
of Seattle Gas Company, 1939 through 1949

| <u>Year</u> | <u>Total Heating Sales</u> |                  | <u>Total Heating Customers</u> |                  |
|-------------|----------------------------|------------------|--------------------------------|------------------|
|             | <u>MCF</u>                 | <u>% of 1939</u> | <u>Number</u>                  | <u>% of 1939</u> |
| 1949        | 1,671,340                  | 241.0            | 7,628                          | 223.5            |
| 1948        | 1,640,803                  | 236.6            | 7,471                          | 218.9            |
| 1947        | 1,315,403                  | 189.7            | 6,274                          | 183.8            |
| 1946        | 1,148,138                  | 165.6            | 4,598                          | 134.7            |
| 1945        | 1,057,100                  | 152.4            | 4,035                          | 118.2            |
| 1944        | 936,220                    | 135.0            | 4,083                          | 119.6            |
| 1943        | 960,433                    | 138.5            | 4,174                          | 122.3            |
| 1942        | 945,458                    | 136.3            | 4,226                          | 123.8            |
| 1941        | 798,553                    | 115.2            | 4,123                          | 120.8            |
| 1940        | 718,703                    | 103.6            | 3,783                          | 110.8            |
| 1939        | 693,461                    | 100.0            | 3,413                          | 100.0            |

Source: Seattle Gas Company Statistics

SUMMARY

In view of the foregoing discussion of the economy of the Seattle Metropolitan District, the growth trends and stability of the market area would indicate that this should be a market in which natural gas sales, at a competitive price, could be developed as indicated in forecasts set forth later in this report.

P A R T II

THE SEATTLE GAS COMPANY  
and  
ESTIMATED MARKET FOR NATURAL GAS IN  
METROPOLITAN SEATTLE AREA

SEATTLE GAS COMPANY

The Seattle Gas Company is a Washington corporation,





L. E. Jones,  
Dir. Ex. by Mr. Nolan.

- 301 -

now serving a 500 BTU manufactured gas to the Metropolitan Area of Seattle and to the towns of Renton, Kent and Tukwila.

#### OPERATION

The manufacturing plant is located on the north shore of Lake Union in the north end of the City of Seattle. Here, tanker deliveries are made of fuel oil, which is the basic fuel for gas manufacture. Present base gas loads are produced by the Pacific Coast Oil Gas process. The major part of the gas requirements above base loads is produced by the Carbureted Water Gas process, and when necessary, on extreme peak days, the production is supplemented with Propane-Air Gas.

Lampblack is produced in the manufacture of oil gas. This is recovered and manufactured into petroleum briquets. A large part of this product is used by the Company as solid fuel in Water Gas production. The balance of the briquets is sold to dealers in the hard fuel markets.

A so called light oil is also produced in the manufacture of oil gas. Considerable quantities are removed for refining and sale of the refined products. These products consist of such materials as benzol, toluol, heavy ends, resins, etc., all of which are produced for resale.

#### MANUFACTURING PLANT

The manufacturing facilities of the Company for producing gas consists of four Pacific Coast oil gas machines, six carbureted water-gas machines and four



L. E. Jones,  
Dir. Ex. by Mr. Nolan.

- 302 -

propane "Gas-Air" machines. The maximum amount of gas produced by this equipment was 26,510 MCF on January 13, 1950. The production was divided as follows: 15,159 MCF. of oil-gas; 7,564 MCF. of water-gas and 3,787 of propane air-gas.

Two of the propane "Gas-Air" machines are located at the Georgetown station. The balance of the equipment is located at the Lake Union plant.

#### FUEL REQUIREMENTS

With the exception of Propane, used for the production of Propane-Air Gas, which is but a small part of total gas production, oil is the only fuel purchased for the manufacture of gas. As mentioned previously, briquets, a by-product of the oil gas process, are the solid fuels used in the Water Gas operation.

Oil is received in tanker shipments from California. Including oil used for steam production, the annual requirements of the Company amount to approximately 900,000 barrels of oil per year.

#### GAS STORAGE AND DISTRIBUTION SYSTEM.

The Company has four storage holders: one of 2,000 MCF capacity at its production plant; two holders of approximately 900 MCF capacity, each, at its Mercer Street station, a mid-town location (at present, however, one of these is reduced to 300 MCF capacity, because of failure in the holder); and one 900 MCF capacity holder at its Georgetown station in the southern part of the city. As of December, 1949, the distribution system consisted of





L. E. Jones,  
Dir. Ex. by Mr. Nolan.

- 303 -

1,070 miles of mains, ranging from 1-inch to 24-inch in diameter. The central section of Seattle is supplied through a low-pressure distribution system through the middle of which runs transmission lines from the plant at the north end to its Georgetown Station at the south end of the city. This transmission line supplies gas to the holders at Mercer and Georgetown stations, as well as to district regulators in the low pressure system. Gas is supplied from the manufacturing plant to the north end, beyond the city limits, on a high pressure distribution system. From the Georgetown pumping station, gas is supplied on a high pressure distribution system to the south and southwest portion of the city and to the communities of Renton, Kent and Tukwila.

ANNUAL PRODUCTION

The annual production of gas for the past four years has been as follows; and there the table set forth for the four years, the total of gas manufactured as divided into oil-gas, water-gas, and propane air-gas.

| <u>Year</u> | <u>MCF Oil<br/>Gas</u> | <u>MCF Water<br/>Gas</u> | <u>MCF Propane<br/>Gas</u> | <u>Total<br/>Gas</u> |
|-------------|------------------------|--------------------------|----------------------------|----------------------|
| 1946        | 1,792,436              | 2,046,241                | 59,690                     | 3,898,547            |
| 1947        | 3,728,520              | 383,606                  | 42,688                     | 4,156,814            |
| 1948        | 3,610,264              | 750,031                  | 48,462                     | 4,408,757            |
| 1949        | 3,836,869              | 532,258                  | 44,848                     | 4,413,975            |

FORECAST OF NATURAL GAS UTILIZATION

BASIC ASSUMPTIONS

In 1948, the Seattle Gas Company employed Ebasco Services, Inc. of New York to make a survey of the Metropolitan Seattle Area to determine what the future



L. E. Jones,  
Dir. Ex. by Mr. Nolan.

- 304 -

market might be for the natural gas in this area. The statistics and tables relative to natural gas in this report are based on that study, tempered with recent experience of the Seattle Gas Company operations.

The estimates made are based on the following assumptions:

1. Natural Gas will be available to the Seattle area within a matter of a very few years.
2. Natural Gas will be made available at a competitive price with existing fuels, and that it will be possible to establish gas rates which will be no major barrier to widespread acceptance of natural gas in this community.
3. The growth and expansion of natural gas use will conform more or less to the experience that has prevailed in other manufacturing gas companies where natural gas has been introduced.
4. The population growth of the metropolitan Seattle area will exceed national averages and that housing construction necessary to accommodate such population growth will continue.
5. Business activity and industrial expansion will continue at a moderately high rate.

#### DOMESTIC USE

In the Domestic General Use field (service which does not include space heating) there has been some loss in recent years to cheaper electric competition, both in number of customers and gas used. With the advent of cheaper natural gas fuel, this loss should be





L. E. Jones,  
Dir. Ex. by Mr. Nolan.

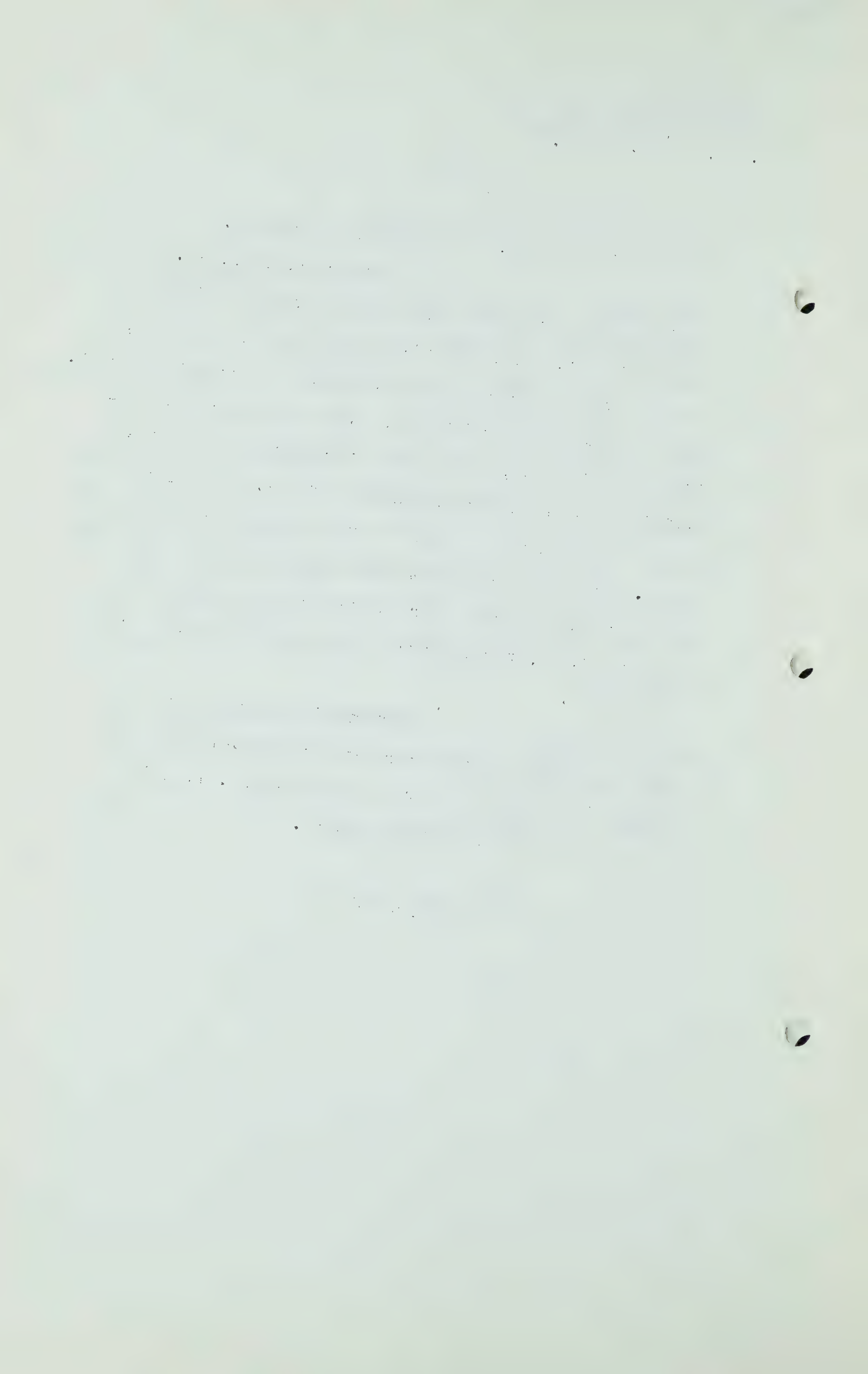
- 305 -

reversed into a gain, as indicated in Table 1.

At December 31, 1949, 15.8% of the Domestic customers fell into the space heating use classification, (includes all uses of gas by customer, combined with central house heating), and accounted for 52.1% of the total domestic MCF use. With the advent of low-priced natural gas, this class of customer should increase greatly both in number and amount of use. The climate of Seattle is such as to require some heating nearly the year round. This is a condition which lends itself to the encouragement of sales for automatic house heating equipment and fuels, particularly of the nature of low priced natural gas.

Information pertaining to the number of domestic customers and the annual total and average MCF use are set forth in Table No. 1, which is included in the back of the report.

(Go to page 306)



L. E. Jones,  
Dir.Ex.by Mr. Nolan

- 306 -

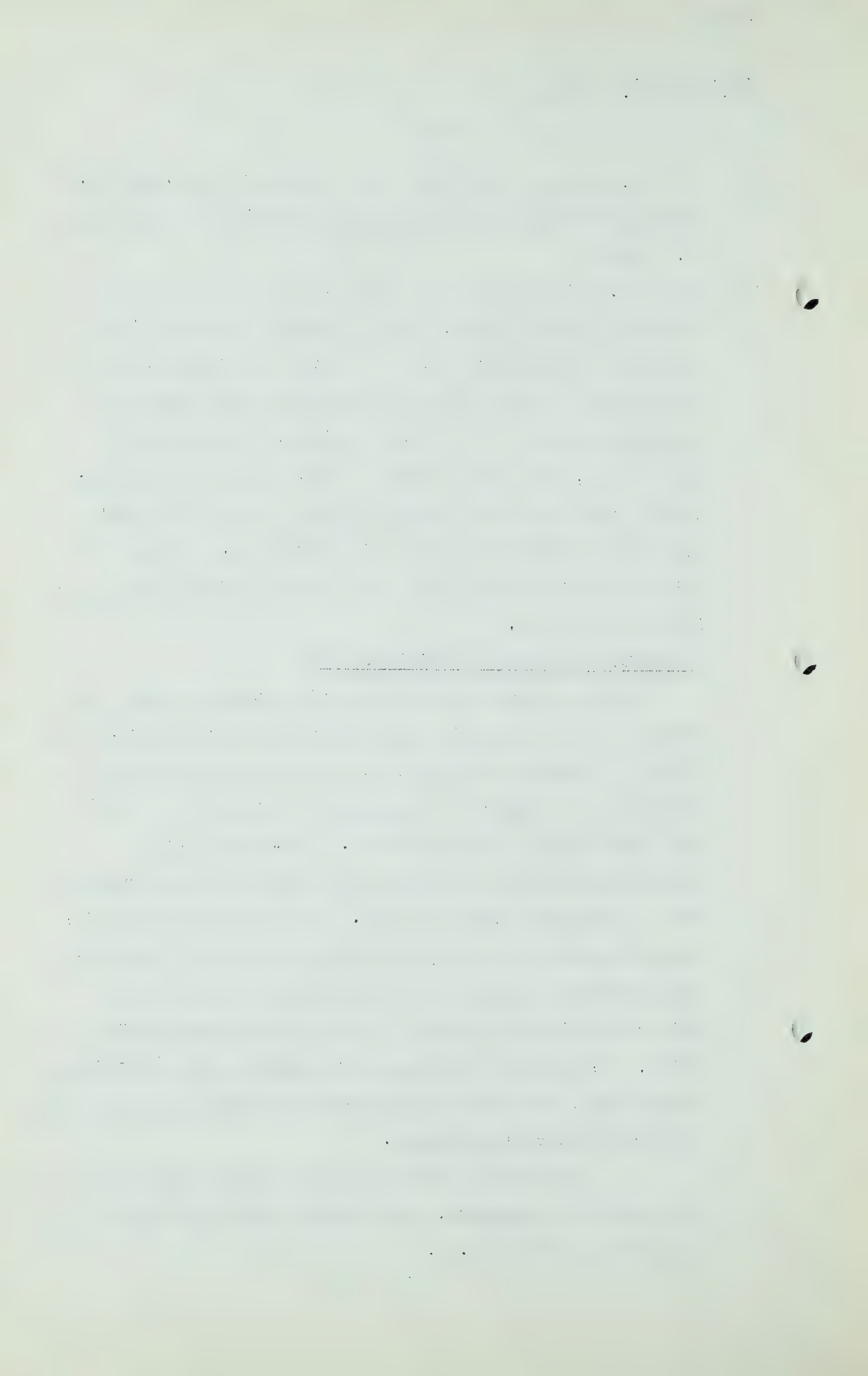
Q And now, perhaps, there are some features of that Table No. 1 that you would like to draw to the attention of the Board, Mr. Jones?

A Table No. 1 is divided into three parts, the number of customers, annual sales, and the annual sales per MCF of customer for domestic use. It shows the experience of the Company on 500 BTU gas from 1946 to 1949 actual, an estimate of what is to be done in 1950. It shows the 1949 actual, and 1950 estimate on the basis of 1,000 BTU. And it shows the anticipated loads on 1,000 BTU natural gas for the first five years of natural gas. That is the full years of natural gas in the Seattle Metropolitan area, if it should come.

#### COMMERCIAL AND SMALL INDUSTRIAL USE

In the general use field of this classification, the Company now has a fairly high saturation of customers. The advent of low-priced natural gas is expected to add more materially in numbers of customers and quantity of use in the space heating classification. (Commercial space heating classification includes gas used for other purposes but is primarily space heating). Cleanliness of service, lower installation costs, and saving of building space has made possible a reasonably large amount of business in this classification of use even on present manufactured gas rates. When these advantages are combined with low-priced natural gas, the number of customers and amount of use should show very material increases.

Details of recent years and future estimates of the number of customers, their annual total and average use are given in Table No. 2.





L. E. Jones,  
Dir.Ex.by Mr. Nolan

- 307 -

Table 2 in the back is similar to the one I have described except it is shown for commercial and small industrial users.

Q I do not think there is anything more required to be said about that, Mr. Jones?

A All right, sir.

Q Go on to Industrial Use, please.

A INDUSTRIAL USE

Ebasco Services, Inc. made a study of the large industries in the Seattle area and their present fuel uses and requirements. From this study, it was assumed that with reasonable competitive natural gas rates, a goodly portion of the fuel requirements could be obtained on natural gas use. Working on the basis of establishing a 70% load factor for the Seattle Gas Company natural gas requirements, the load was divided into firm and interruptible classifications.

Details of estimated number of customers and annual use is shown in Table No. 3, which is similar to Tables 1 and 2, except it is given for large industrial users, and except for the fact that there is no large industrial use under the 500 BTU basis manufactured gas.

Q Yes. And your annual sales increase from the first full year, this is on the firm industrial basis?

A Yes.

Q From 229,000 to 5,465,000?

A Yes, sir.

Q And the interruptible increases from 2,021,000 to 3,535,000?

A Yes, sir.

Q Thank you, Mr. Jones. Now, perhaps you can explain Table



L. E. Jones,  
Dir.Ex.by Mr. Nolan

- 308 -

No. 4 at this stage, because it comes in here now.

A Yes.

#### TOTAL CUSTOMERS AND ANNUAL SALES

Table No. 4 is a summary of Tables 1, 2 and 3. A comparison of recent (1949) gas loads and those anticipated for the 5th full year of natural gas are shown in the following figures. Table 4, as is stated, compiled Tables 1, 2 and 3 into a summary, and the Table referred to here shows the comparison of manufactured gas made in 1949 and its equivalent in natural gas of a thousand BTU. It is divided into 59.1% of the total is Domestic, and 40.9% of the total is Commercial, and Small Industrial. And that taken against the 5th year of natural gas, the annual domestic use will be 22.8%, Commercial use 11.4%, and Large Industrial use 65.8%, or a total of 13,680,000 in the 5th year is estimated.

|         | 1949 Mfg.<br>Gas<br>MCF | Equiv.<br>Nat.Gas.<br>MCF | % of<br>Total | 5th Year<br>Nat.Gas<br>MCF | % of<br>Total |
|---------|-------------------------|---------------------------|---------------|----------------------------|---------------|
| Dom.    | 2,382,017               | 1,181,008                 | 59.1          | 3,120,000                  | 22.8          |
| Com.    | 1,633,887               | 816,943                   | 40.9          | 1,560,000                  | 11.4          |
| L. Ind. | -                       | -                         | -             | 9,000,000                  | 65.8          |
| Total   | 3,995,904               | 1,997,951                 | 100.0         | 13,680,000                 | 100.0         |

#### MAXIMUM DAY REQUIREMENTS

This is set out in Table 5. For recent<sup>years'</sup> experience, the only accurate information is for the total sendout on the maximum day. Therefore, no effort has been made to break this down into classes of use.

For the 1st five full years of natural gas use, the figures supplied are those taken from the report made by Ebasco Services, Inc. In this table the term "Space





L.E. Jones,  
Dir.Ex.by Mr. Nolan

- 309 -

heating" has a different meaning than used in Tables 1, 2, 3 and 4. Here the term means exclusively, gas for space heating, even though a customer may use gas for other purposes.

As stated before, the Industrial load has been divided into firm and interruptible classifications on the basis of maintaining a 70% load factor. This means that interruptible loads will be cut off on peak days when the pipeline capacity is being overtaxed. It is contemplated that peak demands on the pipeline may also be eased by the production locally of high BTU substitute gas.

Q MR. C. E. SMITH: That word should be "eased"?

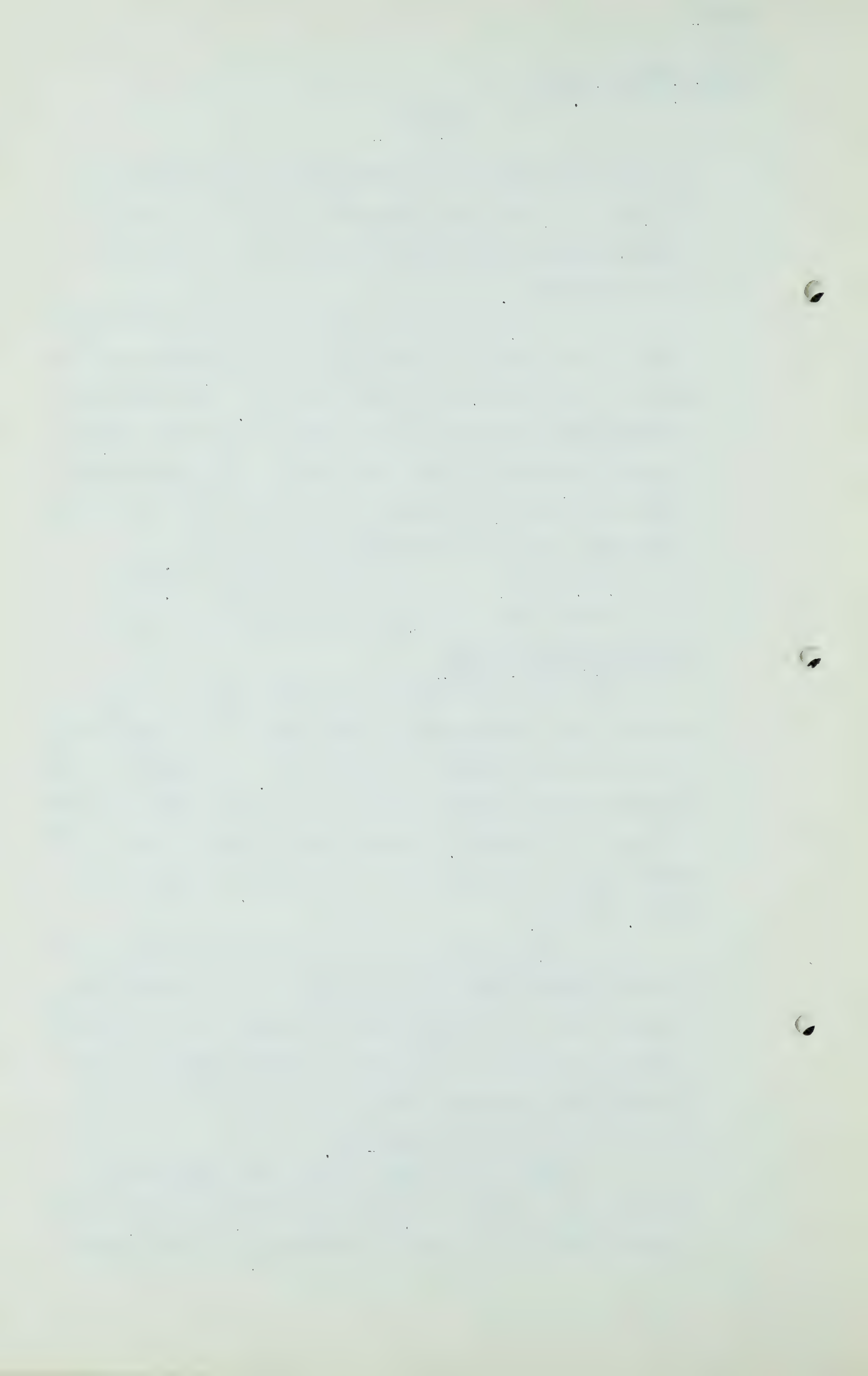
A Yes, the word there is "used" and it should be "eased".

#### THE CLIMATE OF SEATTLE

The climate of the Puget Sound region, in which Seattle lies, is much milder than that of any other section of the continent in the same latitude. Air moving in from the ocean has a warming effect in the winter and a cooling effect in the summer. Average monthly temperatures in the Puget Sound area range from about 40°F. in January up to 63°F. in July.

A consideration of prospective natural gas sales attaches considerable importance to the residential space heating load. It is significant to note that the moderate climate prevailing in this area is particularly suitable for gas space heating because of the greater efficiency for morning and evening warm-ups.

Expressed in terms used by fuel engineers, Seattle has a normal of 4,815 degree days per year. The coldest month on the average is January, with 759 degree



L. E. Jones,  
Dir.Ex.by Mr. Nolan

- 310 -

days. The coldest month of any ever recorded since 1890 was the month of January, 1950, with 1117 degree days.

The following tabulation shows normal degree days, by months, for Seattle and for several comparable cities in the United States and Canada. Additional meteorological data are set forth in Table No. 6. The Table referred to is degree days by months for Seattle, Spokane, Portland, Vancouver, Washington, St. Louis, and Lexington, Kentucky. The source of information being the American Society of Heating and Ventilating Engineers.

Q Mr.Nolan: Yes, I do not think there is anything else in that report itself, Mr. Jones, that I would draw to your attention. Is there something that you would like to mention?

A I think not.

Q Now, is this Table No. 4, is that substantially Tables 1, 2 and 3 added together?

A Yes.

Q In Table No. 3 I notice that you have no large industrial users in these years '46, '47, '48 and '49?

A That is right.

Q Why is that?

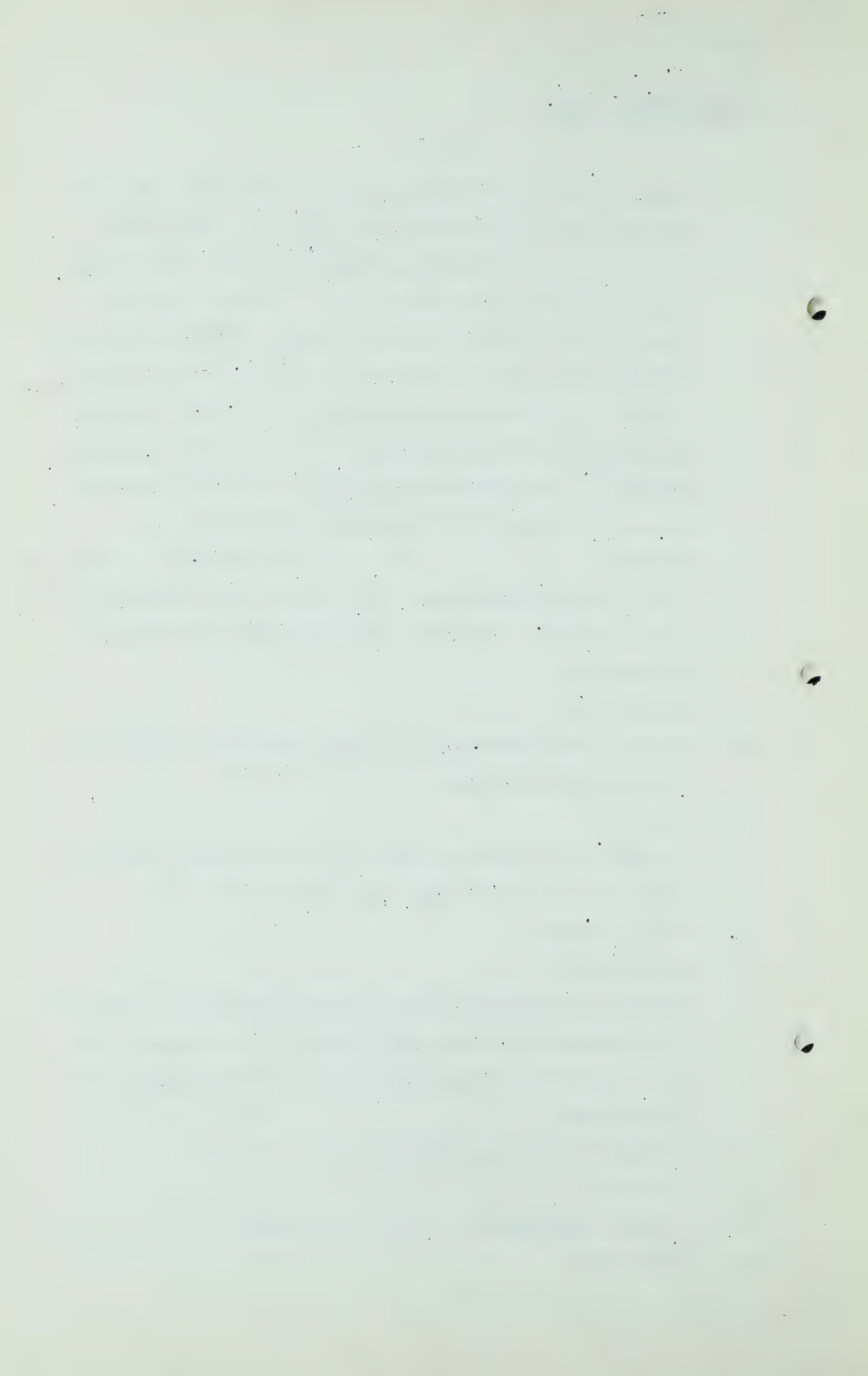
A We have no customers of manufactured gas which we consider to be industrial users. What industrial use we have has been classified as small industrial, and is included with commercial.

Q I suppose price has something to do with it?

A Yes, sir.

Q It has everything to do with it, perhaps?

A Well, yes.



H-3-f

L.E. Jones,  
Dir.Ex. by Mr. Nolan

- 311 -

Q And it is because of the price that you have not got these large industrial consumers?

A Yes, sir.

Q Well, now, tell me this, at the end of the 5th year what is the percentage of your industrial sales as opposed to sales of gas for all other purposes? Where does that appear?

A On Page 20.

Q That is, the large industrial percentage of the total is 65.8?

A Yes, sir.

Q Yes, that is very interesting. Now, you were requested by the applicant Company to make a computation based on an average cost to you of 30 cents per MCF?

A Yes.

Q 35 cents per MCF?

A Yes.

Q And 40 cents per MCF?

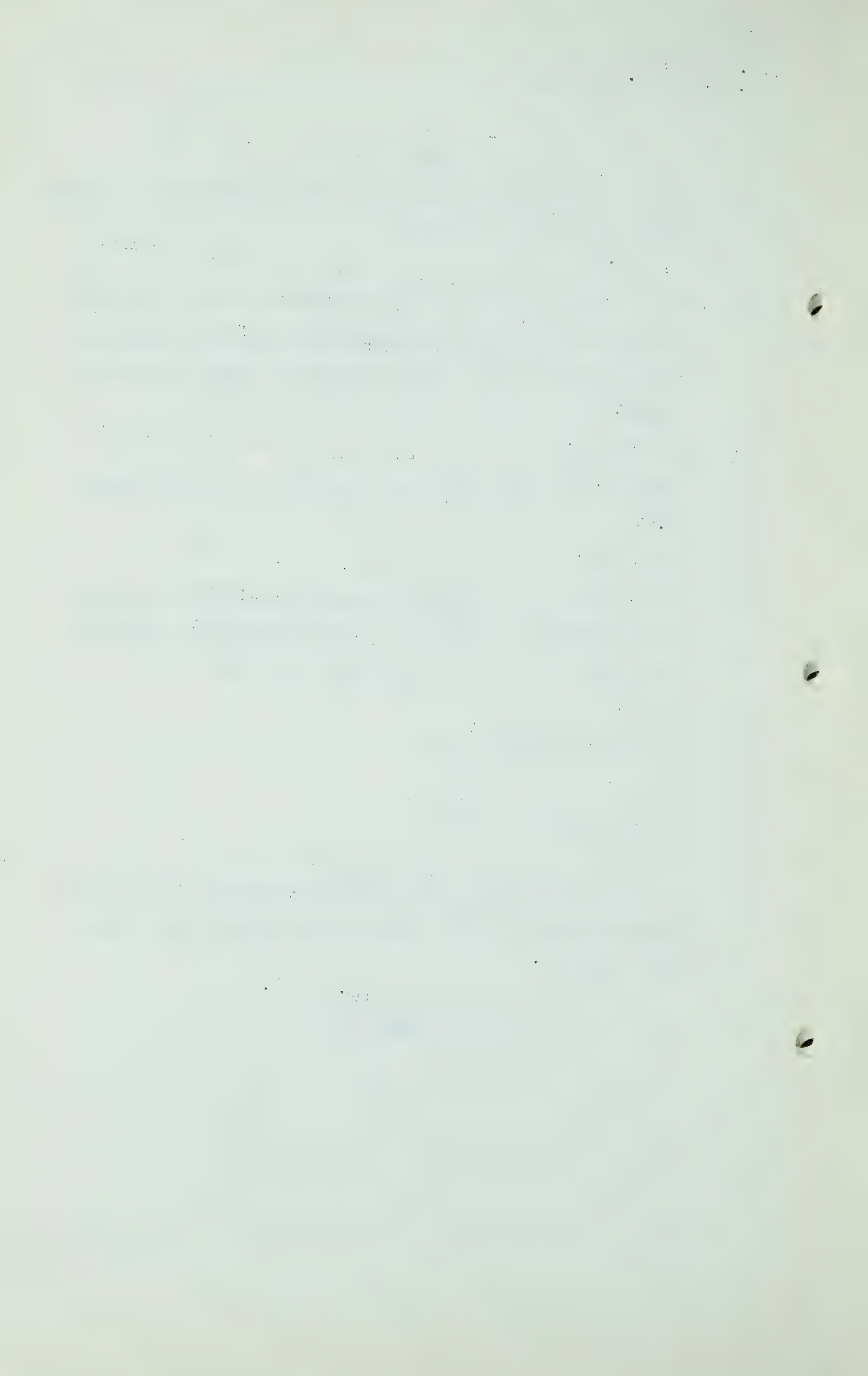
A Yes.

Q In order to ascertain what effect that price of 30 on the upward movement in five years would have on your estimate?

A Yes, sir.

(Go to page 312).





L. E. Jones,  
Dir. Ex. by Mr. Nolan.

- 312 -

Q Yes, and we are speaking only of industrial customers?

A Yes, sir.

Q Have you had an opportunity of making that computation?

A Yes, sir.

Q Perhaps you would let me know then what effect a 30 cent price would have on your estimate?

A May I preface my answer with this remark. Our estimate is based on a potential load providing we can buy gas at a price which will permit us to sell it competitively.

Q Yes?

A Now on the basis of 30 cent gas that makes it impossible for us to obtain more than about 10 per cent of the firm industrial load.

Q About 10 per cent of the firm industrial load?

A About 10 per cent of the firm industrial load.

Q That is at 30 cents?

A 30 cents.

Q What about the interruptible?

A We might probably hang on to the interruptible as indicated in the brief.

Q Well now, assuming a price of 35 cents?

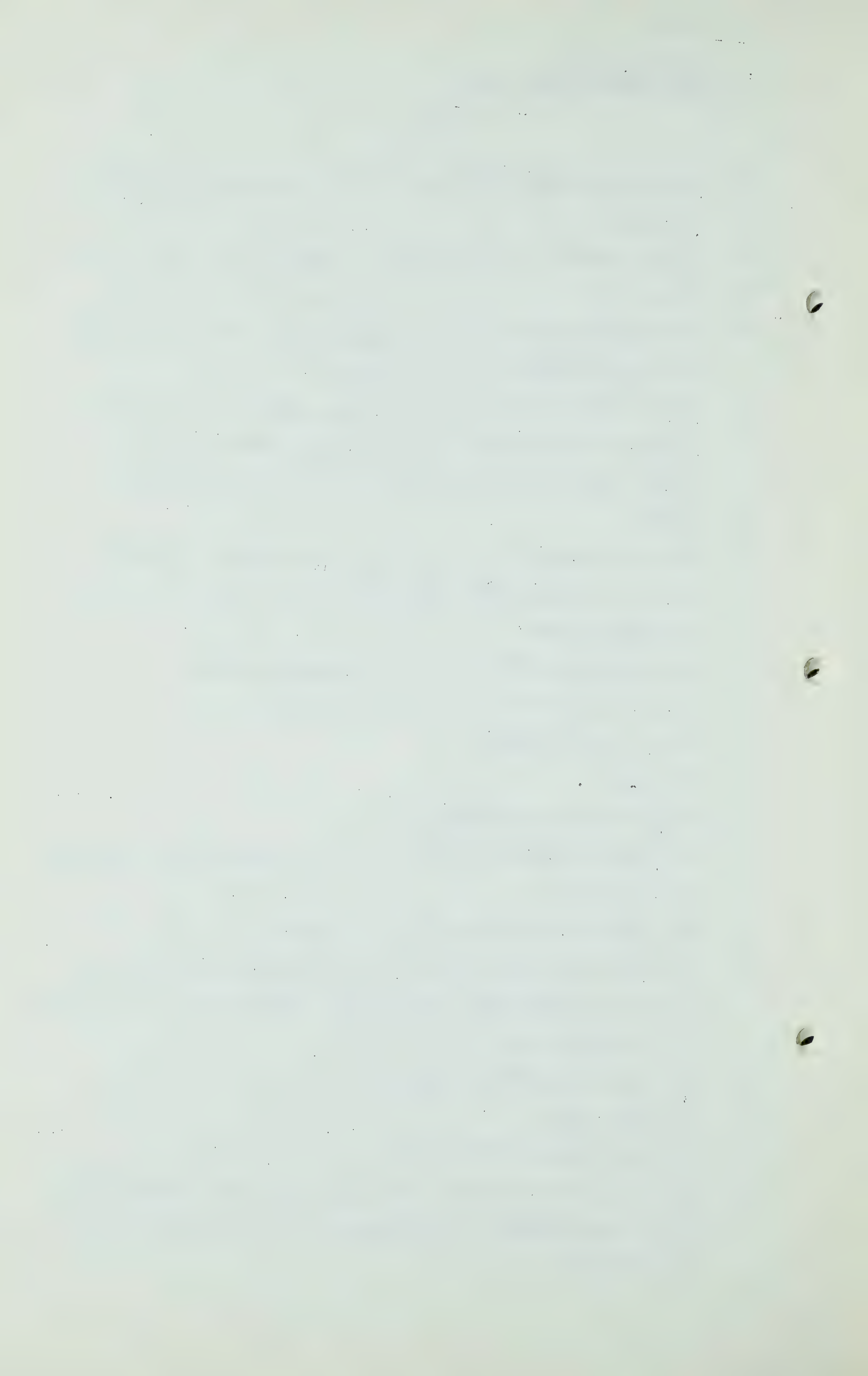
A We would lose practically all of the firm industrial load and the interruptible load becomes questionable. The chances are we could retain it.

Q You have marked that doubtful?

A Doubtful, yes.

Q And then coming to 40 cents?

A 40 cents, we would lose practically all the industrial load that we projected as being possible in the Seattle metropolitan area.



L. E. Jones,  
Dir. Ex. by Mr. Nolan.  
Cr. Ex. by Mr. Fenerty.

- 313 -

Q When you say that you mean firm and interruptible?

A The whole of the industrial load, yes.

Q That would mean that you would lose 65.8 per cent of your total volume?

A That is right.

Q If there is an importation of gas into the State of Washington and made available to you, do you intend to sell that gas as a raw product?

A No, sir, in no sense. Not in the sense that you mean that word.

Q Using it as a raw material for manufacturing other products?

A Yes.

Q You do not intend to do that?

A We do not intend to do that.

CROSS-EXAMINATION BY MR. FENERTY

Q In other words, you do not intend to sell gas as a raw material, is it because of price?

A Principally, yes, sir.

Q You would not be able to meet the low price required?

A That is right.

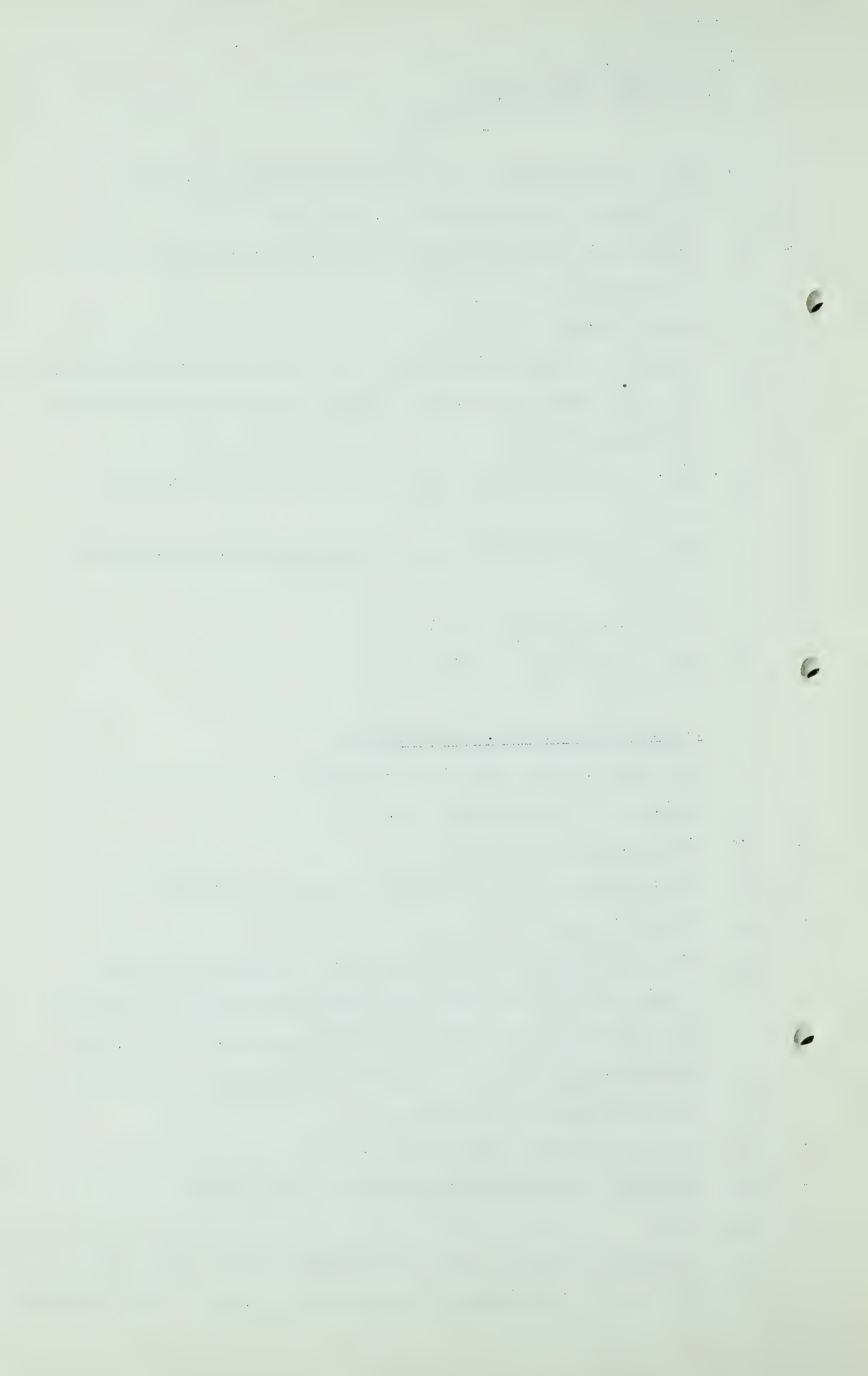
Q When you speak of the share of the industrial load you can compete with at certain prices and so on, will you tell me what you figure is the distribution cost per Mcf. average, approximately? You have to have some figure in order to be able to make this statement.

A I do not quite gather your question.

Q You say that at certain prices you can compete?

A Yes.

Q Have you worked out what those certain prices will be to let you take the certain percentages? That is, what you would





T-3-3  
L. E. Jones,  
Cr. Ex. by Mr. Fenerty.

- 314 -

sell for?

A Yes.

Q Not what you buy at?

A That is right.

Q Well now, can you tell me by any chance what you think the average distribution costs are? I know it has nothing to do with the price you sell for but it has something to do with what you buy it for?

A I cannot give it even approximately. I do not have that information with me.

Q Have you worked out any calculation as to what you will have to buy gas at in order to get a reasonable percentage of these industrial loads?

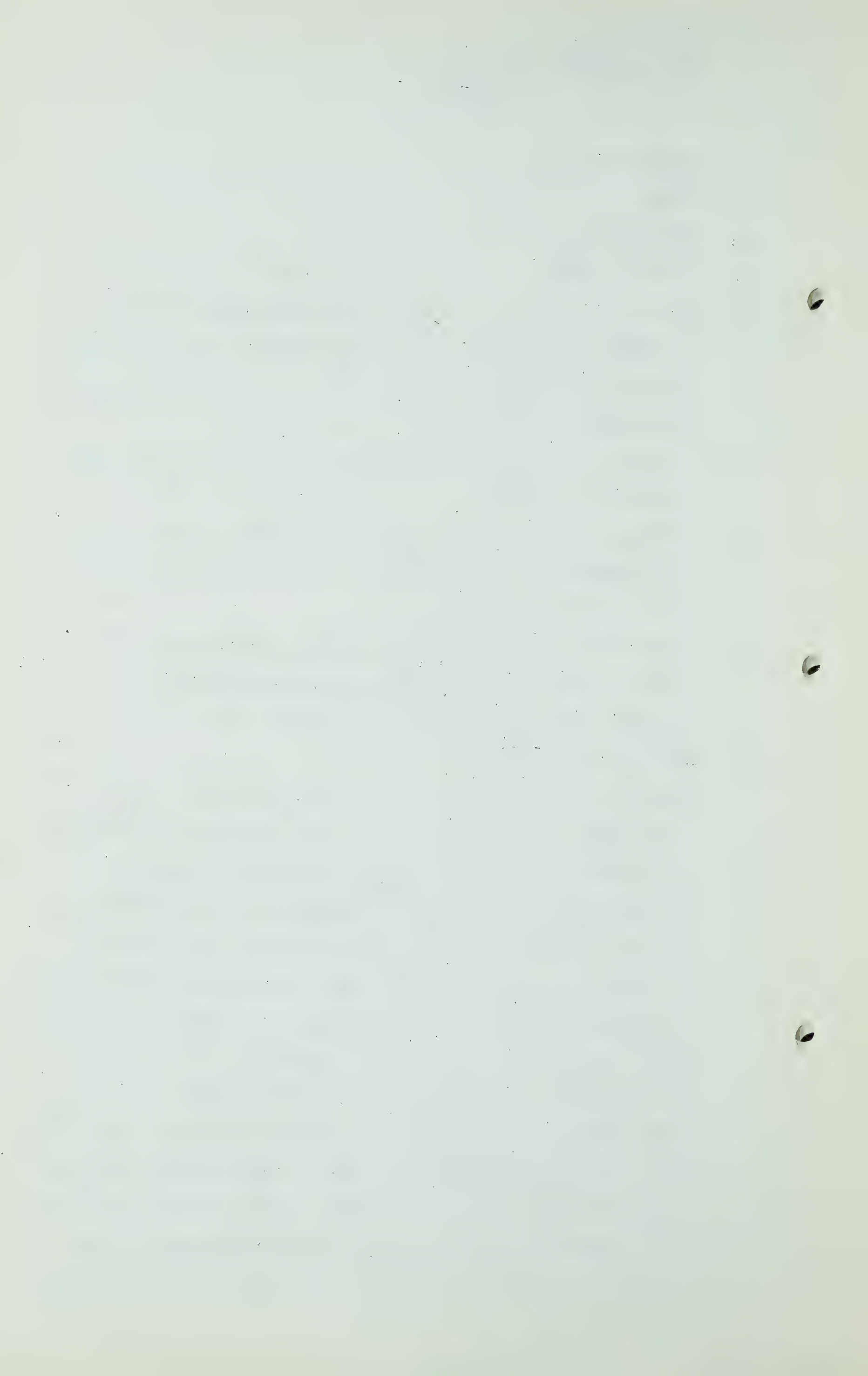
A Just what we have said here, that at 30 cents and 35 cents and 40 cents, we have made some calculations on that.

Q And that has been based on distribution costs, I take it?

A Yes, over-all costs.

Q What I am interested in is a statement we have had from other sources that to meet fuel oil competition in Portland and Seattle gas must be sold for industrial purposes at 25 cents and I am trying to figure out from that what you have to pay for the gas. Would you pay - you would have to buy it at a certain price and then you would have certain distribution costs. I wonder if you could give me an approximate idea, 5 cents, 6 cents or 7 cents?

A I will tell you this the type of business has a lot to do with what the cost will be and how much a load it will take. Any utility has certain fixed costs. The more gas we sell the lower will be the unit price. So the average cost, it all depends on the kind of load, but I will tell you one thing, if we only sell 10 per cent of all the gas we would



T-3-4

L. E. Jones,  
Cr. Ex. by Mr. Fenerty.

- 315 -

be stopped right there.

Q You are figuring on 62 per cent of the industrial load - -

A No, sir, it is not that. The potential load that can be obtained in Seattle and that potential load we figure at 65 per cent of the total industrial.

Q But you are not coming here in the dark, not knowing what you would be prepared to pay for gas at your gate, are you?

A No, because we quoted three prices.

Q Have you figured it?

A Yes, sir.

Q And when you figured it you had to take into account the distributing costs?

A Yes.

Q Why won't you tell it to me, is it a secret?

A No, sir.

Q Then tell me?

A I will give you an average figure.

Q Yes, that is all right.

A The average figures of course are estimates for all the gas purchased which is 13,680,000 a year, within the neighbourhood of 20 cents.

Q For distribution?

A Yes, sir.

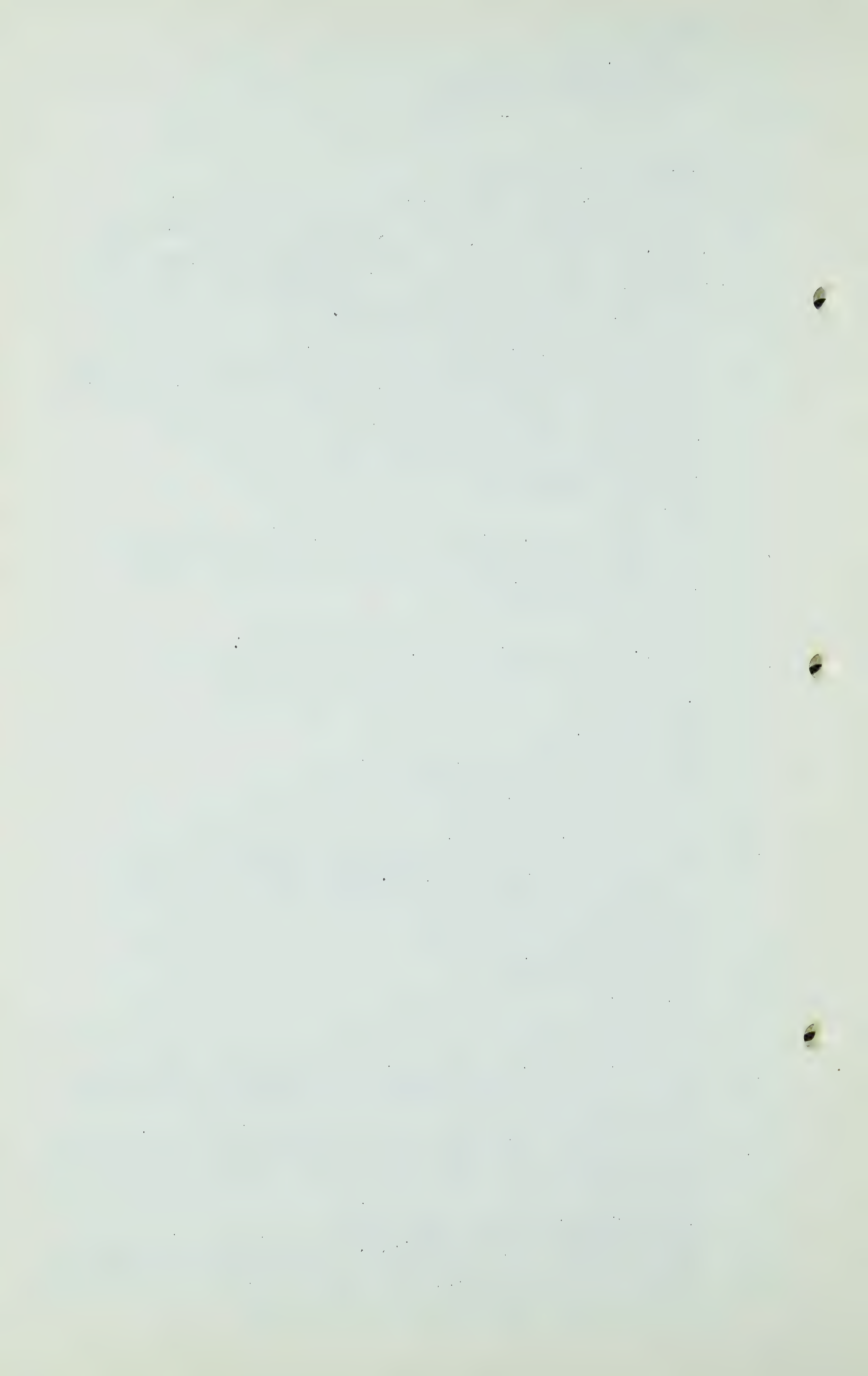
Q As high as that?

A That is the over-all expense, other than the cost of the gas at the gate.

Q That includes your high cost of distribution areas, households and so on?

A And overhead, returns and profit.

Q Would you give me, if possible, the estimated distribution cost for your industrial gas, or can you?



L. E. Jones,  
Cr. Ex. by Mr. Fenerty.

- 316 -

A I might put it this way. What we pay for the gas is composed of two things, a demand charge that is based on our peak day.

Q Yes?

A And the capacity of the transportation line.

Q Yes?

A And also commodity. That in general is the way contracts are drawn for the delivery of gas, natural gas. In case it can be sold on off-peak loads, summer time for example, we could sell that at quite a low price and make a profit on it.

Q Yes?

A Because it will lower the average of the all-over cost.

Q Let me see. Are you going to have both demand and commodity charges?

A I am not sure. I think that is the general practice.

Q Are you going to have customer charges? We have a lot of them in retail distribution. We do not have them here in the purchase of gas by the utility.

A Yes.

Q It is your figuring this gas will be sold to you on the basis of customer demand and commodity charges?

A Yes, sir.

Q I have not run into that in sales to the distributor, so it would rather difficult for you to give me your estimate of the distribution costs of the industrial gas?

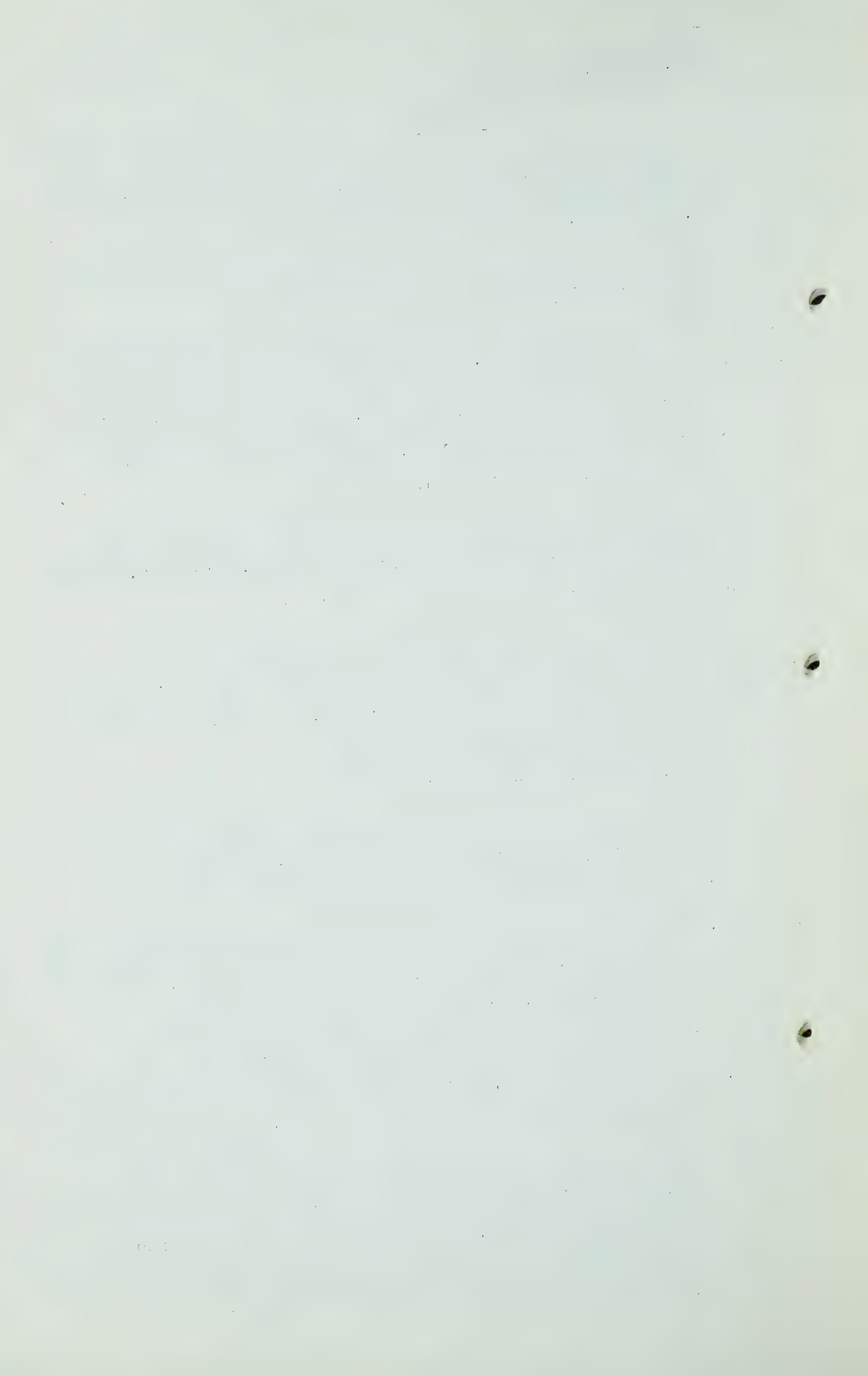
A Yes, I think it would be, right at the moment.

Q The best you can tell me is it averages 20 cents?

A Yes.

Q I have been rather impressed with the review of the tremendous growth on the West Coast which we all realized was going on. But I have been wondering in the other situation if your report also comes to this qualification





L. E. Jones,  
Cr. Ex. by Mr. Fenerty.  
" " " Mr. Bruce Smith.

- 317 -

in Mr. Davidson's report where he says, "It is believed that the estimates of consumption have been made on a most conservative basis. They might easily have been higher without being unduly optimistic." I gather that is perhaps your position too?

A It is possible.

Q It is not stretching anything to say we can all look forward to possibly greater consumption of gas than has been estimated in any of these briefs?

A I would leave it just the way I stated it there.

Q Thank you.

CROSS-EXAMINATION BY MR. BRUCE SMITH

Q Mr. Jones, in presenting your brief here I take it that you are not supporting the application of the Northwest Company, who requested you, apparently, to come here and give evidence, nor the application of any other applicant company?

A That is right.

Q You are quite impartial?

A Yes, sir.

Q Now you have given us a lot of figures. Is it fair to ask you whether those figures have been made available to such applicant companies as have asked for them?

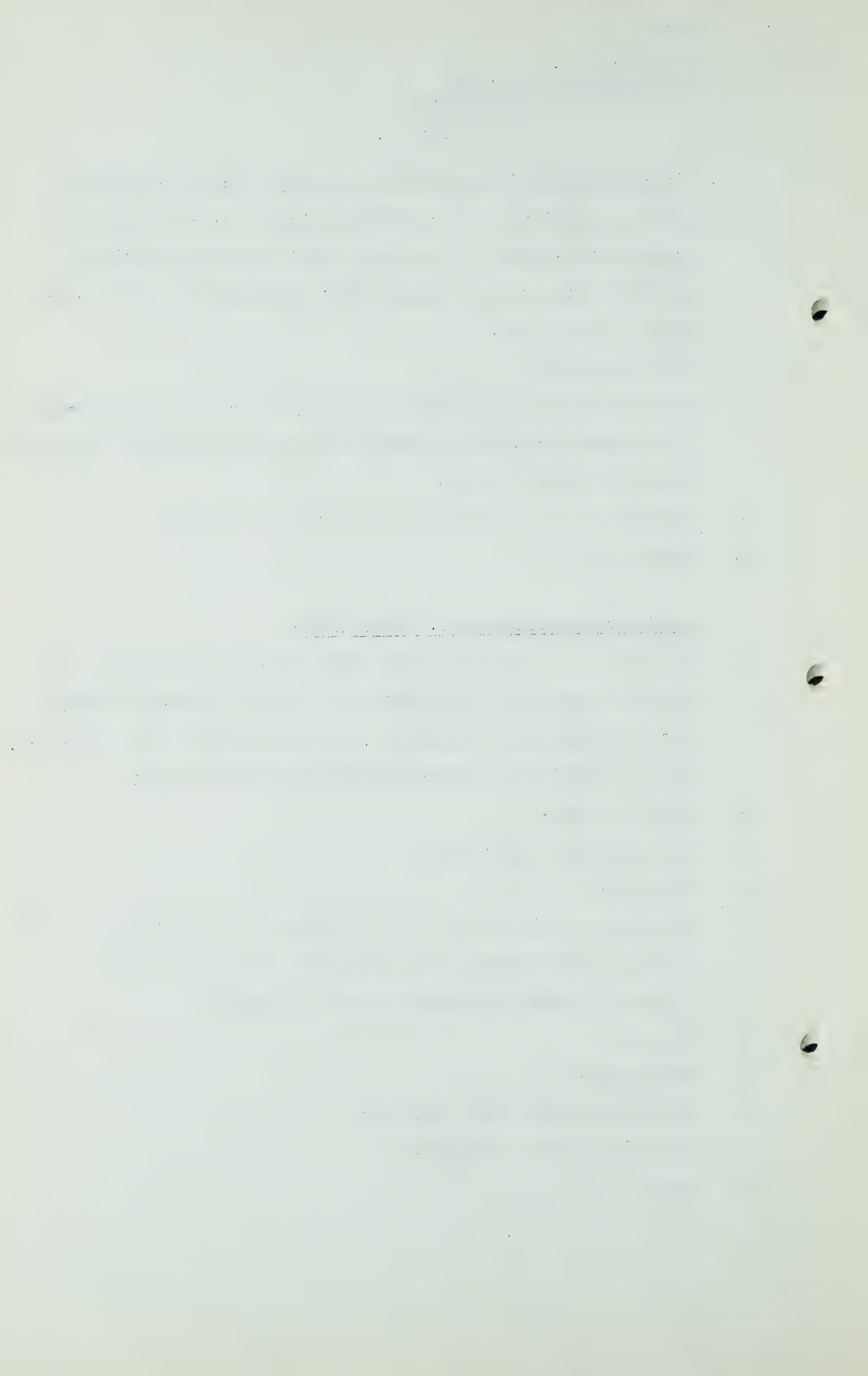
A Yes, sir.

Q Previously?

A Yes, it has been made available.

Q Some time back, I suppose?

A Yes.



L. E. Jones,  
Cr. Ex. by Mr. S.B. Smith.

- 318 -

Q I would like to go over some comparisons with you, some of the figures shown by you in your Table 4 and some of the figures given in respect of Seattle by the Westcoast Company in their brief No. 39, Statement 2 attached thereto. I refer to annual sales MCF. per customer, and I am going over the 5th year at the right hand side. You showed domestic consumption of 3,120,000 and Westcoast Transmission Company, in its brief, Exhibit 39, gives a figure of 4,408,800. In the light of their figure you, I suppose, would still stick by your own figure as being, in your opinion, the most accurate estimate that it is possible for you to give?

A Might I put it this way in answering your question. This is our estimate and it is an estimate and I do not propose to say that somebody else's is wrong or right.

Q Nor do I.

A We think ours is as close as an estimate could be.

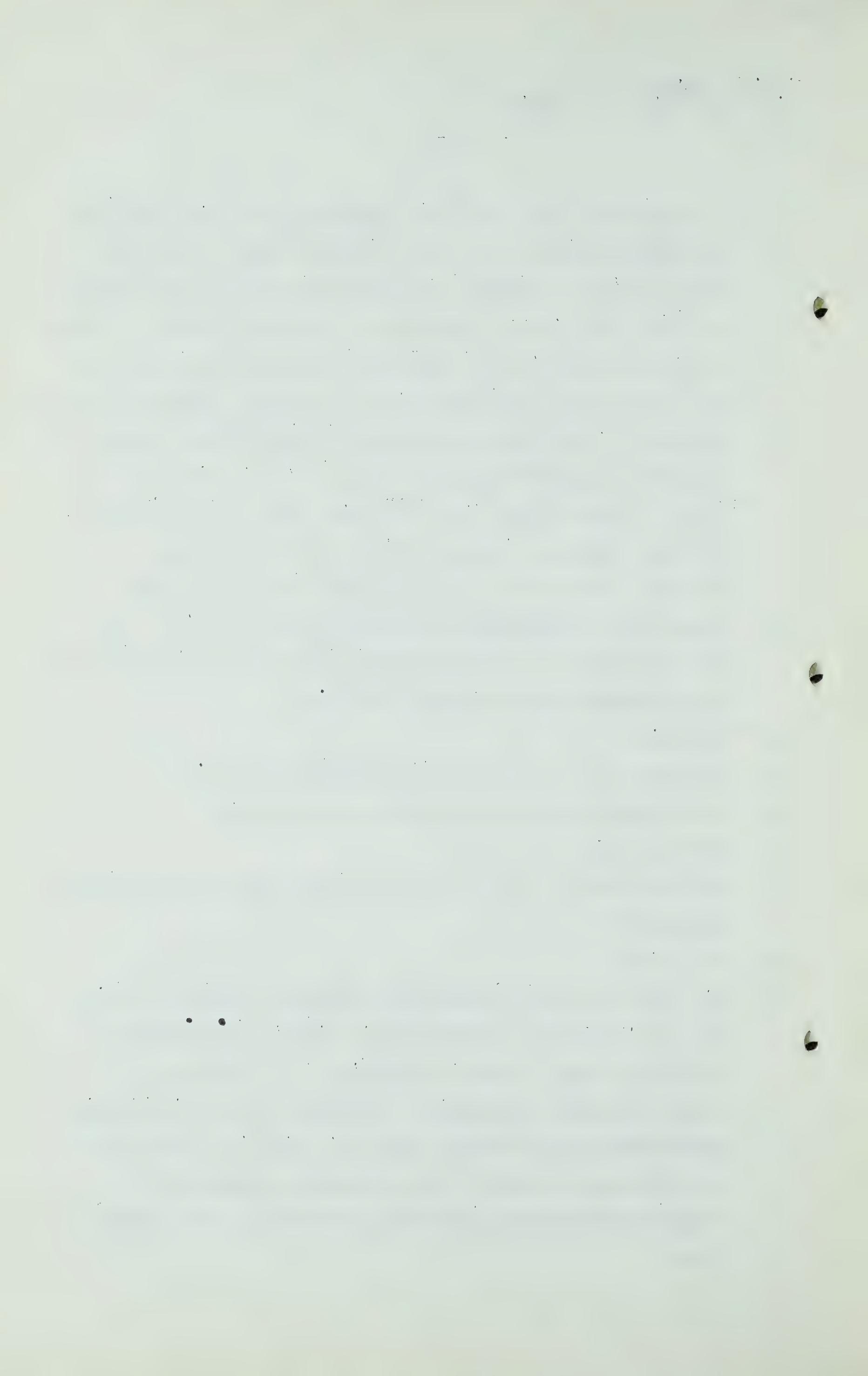
Q In the light of your own experience behind you?

A That is right.

Q And your local interests and your local means of information available to you?

A Yes, sir.

Q Now, when we come to commercial and small industrial users, you show 1,560,000 and Westcoast 1,469,600, practically no variation there. There is, however, a big variation in large industrial firm users. You show a total of 5,465,000, whereas Westcoast showed a total of 3,650,000. There is a very substantial drop in firm industrial commitments as compared with the big increase by Westcoast in the domestic field?





L. E. Jones,  
Cr. Ex. by Mr. S.B. Smith.

- 319 -

A Yes.

Q Now, the interruptible. You show a total of 3,535,000 and they show a total of 3,500,000. Those again are roughly comparable. Your total is 13,680,000 and their total 13,028,400 so they have decreased your total, decreased your firm interruptible very substantially and increased the domestic very substantially.

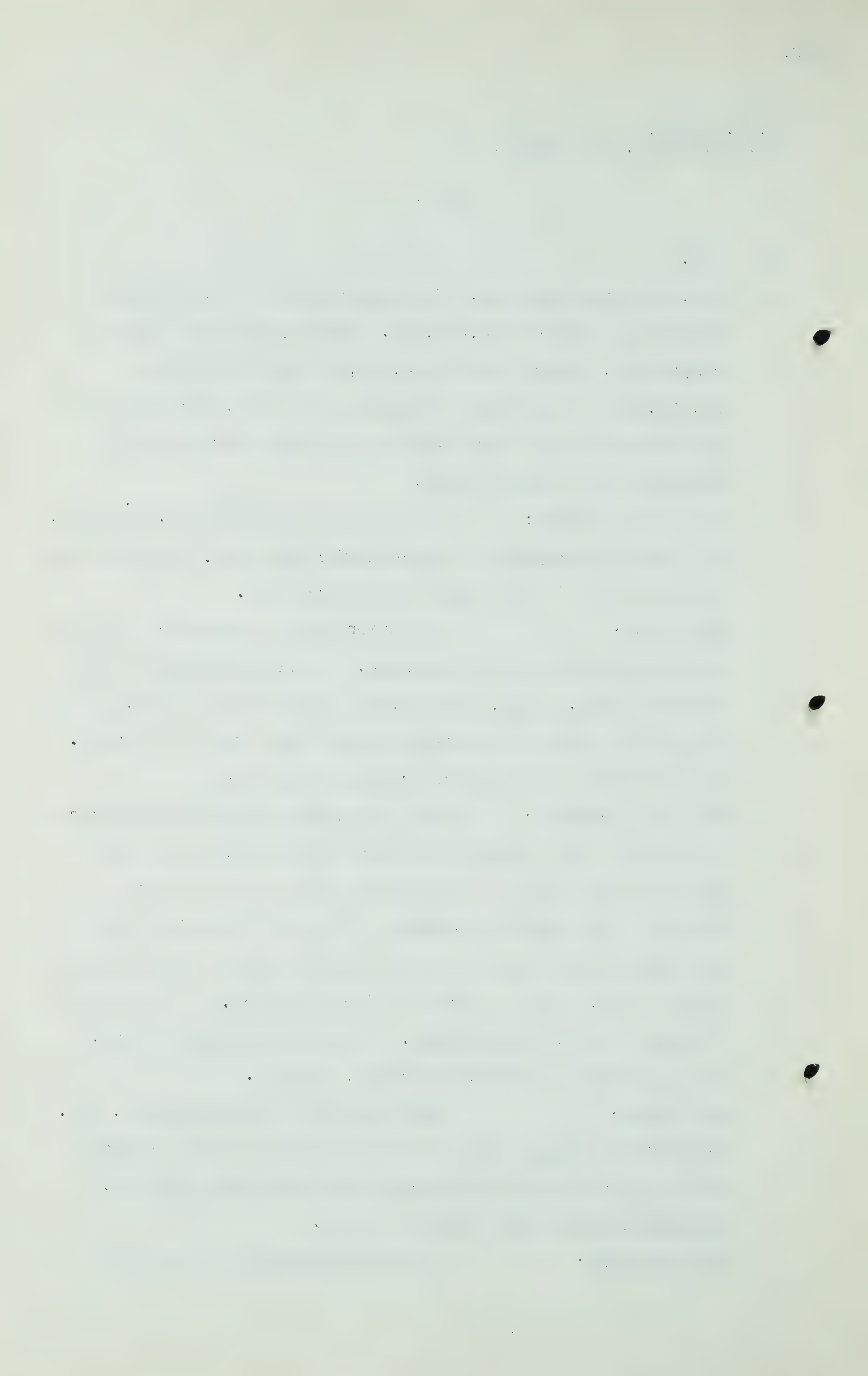
MR. D.P. McDONALD: I have some questions, Mr. Chairman, but I am not prepared to proceed with them now. There is only 5 minutes and it will take longer than that.

MR. NOLAN: I mentioned the convenience of these gentlemen earlier in the morning. It was particularly with respect to Mr. Jones, who has, for reasons of his own, got to leave very soon and is anxious to get away from here today. Now, I wonder how long Mr. McDonald would take.

MR. D.P. McDONALD: Well, sir, there has been introduced in evidence this morning statements which have never been placed on the record. I refer to this 35 and 40 cents. Frankly, I am taken by surprise. I do not know just what the implications are and I just wanted to give some consideration to it. I do not want to inconvenience. The reason I suggest that, I thought Mr. Jones possibly could stay. I do not want to inconvenience Mr. Gellert.

MR. NOLAN: That possibly is the solution. Mr. Gellert will remain and he is the president of the company and is in a position to discuss these questions with Mr. McDonald, and would be glad to do so.

THE CHAIRMAN: Is there anybody else wishes to



Discussion.

- 320 -

question Mr. Jones? Had you anything you want to ask Mr. Jones other than on the 35 cents?

MR. McDONALD: No. It was more on the matter of the other items. If Mr. Gellert is going to remain - -

THE CHAIRMAN: You are satisfied with Mr. Gellert?

MR. McDONALD: Yes.

MR. NOLAN: Mr. Gellert has told me he will be available and able to discuss these matters with Mr.

McDonald. Mr. Jones is excused?

THE CHAIRMAN: Yes.

(The Hearing then adjourned until 9:30 A.M. June 1st, 1950.)

: : : : : : : : :











